Mines and Mineral Activities 1983

Northern Affairs Program

Miner at Shear Lake portal entrance.
Photo courtesy Cullaton Lake Gold Mines Ltd.

Published under the authority of the
Hon. David E. Crombie, P.C., M.P.,
Minister of Indian Affairs and Northern Development
Ottawa, 1984

QS-8343-000-EE-A1
Catalogue No. R71-S/1983E
ISBN 0-662-13426-5

Cette publication peut aussi être obtenu en français sous le titre :
Mines et minéraux Activités 1983

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Introduction

This report covers mines and mineral activities north of 60 for the calendar year 1983.

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Executive Summary

Mineral production in the Yukon Territory during the calendar year 1983 was valued at $59 million compared with $169 million in 1982 and $268 million in 1981. The drastic decline in mineral production value during 1983 resulted from the shutdown of all lode mines in Yukon during the first half of the year. The drop in mineral production value was the largest in percentage terms recorded among the provinces and territories of Canada. Gold production from Yukon placer mines accounted for $50.5 million or 85 per cent of the total mineral production value of $59.4 million.

Whitehorse Copper Mines Ltd. permanently closed its copper mine near Whitehorse at the end of 1982 because of ore reserve depletion. *Cyprus Anvil Mining Corporation's* Faro Mine was closed in June, 1982 and reopened in May, 1983 to commence an overburden stripping program. This program is expected to result in mill production of lead and zinc concentrate in 1985 if issues related to rail transportation and hydroelectric services are resolved. *United Keno Hill Mine's* silver operations reopened in August, 1983, at a 25 per cent reduction in production rate, after being shut down since July, 1982.

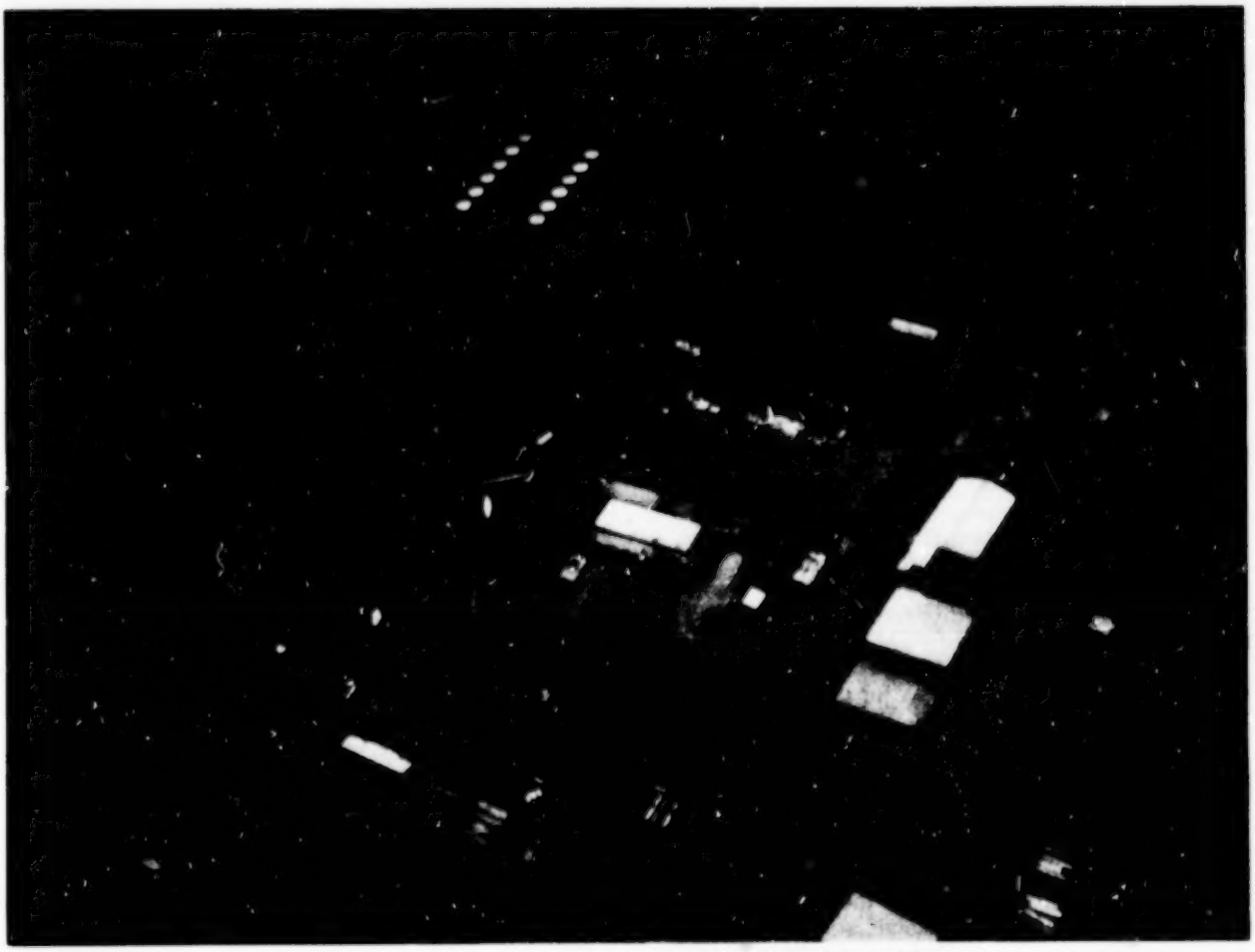
The leading sector in the Yukon mining economy was the Yukon placer gold mining industry. Gold production declared for royalty payment in 1983 increased 28 per cent to 2 932 kg of crude gold (94 275 crude troy oz.) compared with 2 290 crude kg (73 626 crude troy oz.) during the previous year. Statistics Canada reported placer gold production in 1983 for the Yukon at 3 008 kg of crude gold.

Mineral production in the Northwest Territories during the calendar year 1983 was valued at $532 million compared with $468 million in 1982. Despite the increase in mineral production value, the continuing economic recession and concomitant low prices for base metals and tungsten combined to make 1983 a difficult year for some mines and mining communities in the territories. Gold production remained the bright spot in the industry, with a 67 per cent increase in production value from $91 million in 1982 to $153 million in 1983. The value of tungsten production (WO_3) declined by $24.6 million because of the 10-month shutdown of *Canada Tungsten's* mine.

Eight mining companies treated ore from 11 mines at 10 milling plants. Falling lead and zinc prices forced Pine Point Mines Limited to shut down on January 2, 1983. However, the mine resumed operation on June 15, 1983. Similarly, uneconomic tungsten prices forced *Canada Tungsten Mining Corporation Limited* to shut down its Cantung mine and mill operation at the end of January 1983. The mine resumed production on November 28, 1983. Gold production dropped at *Cominco's* Con Mine because of a two-month strike that lasted from mid-July to mid-September, 1983. *Giant Yellowknife Mines Limited* cut back gold ore mining production at its Yellowknife operation by 25 per cent at the end of March to extend the life of ore reserves.

Among relatively new producers, both *Echo Bay's* Lupin Mine and the *Cullaton Lake Mine* increased gold production. *Echo Bay Mines Ltd.* increased its mill capacity by 20 per cent from 900 to 1100 t per day. *Cullaton Lake Gold Mines Ltd.*, following a successful production year, plans to increase mill capacity to approximately 360 t per day in 1984 to accommodate ore production from its new Shear Lake Mine. In August, *Giant Yellowknife Mines Limited* commenced operations at the Salmita gold mine. Ore from Salmita was milled at the rehabilitated Tundra mill, 5 km to the south of the Salmita Mine. After a two-year period of limited production but intensive under-ground development and exploration, *Terra Mines Ltd.* doubled the capacity of its Camsell River silver mill from 225 to 500 t per day. In the High Arctic, operations at *Cominco's* Polaris Mine and the *Nanisivik* Mine continued successfully during the year despite low lead and zinc prices. The Polaris Mine concluded its first full year of operations by producing more concentrates than its rated capacity.

Production from the three lead-zinc mines, Pine Point, Polaris and Nanisivik, together increased 7.1 per cent for lead and 4.7 per cent for zinc compared with the previous year. This production was achieved in spite of the fact that *Pine Point Mines Limited* was closed for six months.



Aerial view of the Salmita Mine.
Photo courtesy Giant Yellowknife Mines Ltd.

Yukon Territory

Mineral Production

Mineral production in the Yukon Territory during the calendar year 1983 was valued at $59 million compared with $169 million in 1982 and $268 million in 1981. The drastic decline in mineral production value during 1983 resulted from the shutdown of all lode mines in Yukon during the first half of the year. The drop in mineral production value was the largest in percentage terms recorded among the provinces and territories of Canada. Gold production from Yukon placer mines accounted for $50.5 million or 85 per cent of the total mineral production value of $59.4 million.

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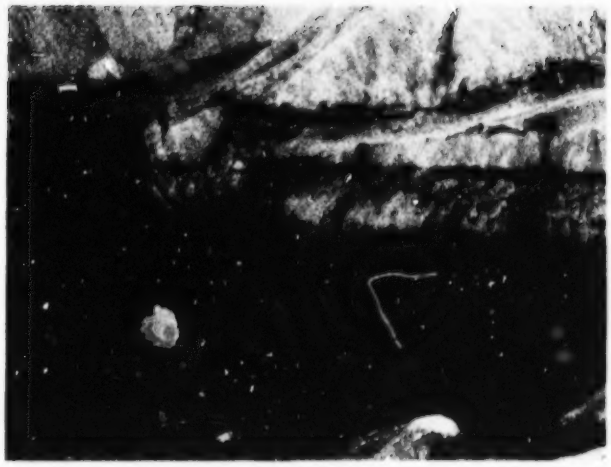


Sigma Group, Bonanza Creek (Klondike area). The pay gravel is the dark coloured Bonanza Creek gravel beside the equipment. This is overlain by White Channel Gravel tailings.

Three new small mines produced ore from high-grade silver veins. *Springmount Operating Company* produced 106.5 t of ore of its Mount Keno property (8) in the Keno Hill area and *Dawson Eldorado Gold Exploration Ltd.* produced 599 t at its PLATA property (2). In addition, *Archer, Cathro and Associates Ltd.* produced 390 t of ore from the Sadie Ladue vein in the Keno Hill area.

The Yukon accounted for 4.3 per cent of the gold, 1.6 per cent of the silver, and 0.2 per cent of the lead produced in Canada in 1983. Yukon mineral production value declined to 0.8 per cent of the value of Canada's metallic mineral production in 1983 compared with 2.45 per cent in 1982.

*numbers or letters in parantheses indicate the location of the property on the Yukon map.

At year's end 1983, the two operating lode mines, *Cyprus Anvil* (b) and *United Keno* (a) employed 372 persons compared with 1 030 persons employed at the Yukon's three operating lode mines during the first half of 1982. An estimated 750 persons were seasonally employed in placer mining operations during 1983. In addition, some 18 persons were seasonally employed in three underground placer gold mines and 40 persons were employed seasonally in exploration development and production in small-lode underground mines.

Table 1.
Mineral Production of Operating Mines, Yukon Territory, 1982 and 1983

Company, Mine and Commodity	1983 t	1983 kg	1982 t	1982 kg
Cyprus Anvil Mining Corp., Faro Mine				
lead	—		33 905	
zinc	—		59 392	
silver		—		28 017
gold		—		628
United Keno Hill Mines Ltd.				
lead	484		9 648	
zinc	63		119	
silver		19 911		37 284
Whitehorse Copper Mines Ltd.				
copper	—		7 236	
silver		—		4 716
gold		—		342

Source: Department of Indian Affairs and Northern Development.

Mines

Cyprus Anvil Mining Corporation - Faro Mine

Cyprus Anvil's Faro Mine (b)* was forced to close on June 4, 1982, because low lead and zinc prices made its operation uneconomic. On May 24, 1983, the Faro Mine was reopened to commence a two-year overburden stripping program of the Faro No. 3 ore deposit. The program will involve removal of 6.6 million cubic metres of overburden. To the end of December, 1983, a total of 2.4 million cubic metres of overburden had been removed. The program will result in significantly lower production costs when the mill starts processing ore. Mill start-up is expected in 1985, depending on resolution of contracts related to rail transport and electrical power services, as the main outstanding issues. The reopening provided employment for 215 persons and the workforce will be increased substantially following recommencement of mill production.

The implementation of Cyprus Anvil's overburden removal program calls for a $50 million dollar investment, of which half comes from the company and of the remaining $25 million, $19.6 million is provided by an interest-free federal government loan, and $4.2 million from the federal government Unemployment Insurance Act (UIA) Program. The Yukon territorial government will top-up the UIA Program's contribution with $1.2 million. In addition, the Steelworkers Union made wage and productivity concessions. When the mine closed, it was the largest private sector employer in Yukon, accounting for some 15 per cent of Yukon's labour force and 19 per cent of wage earnings.

Type:	Open pit
Location:	209 km northeast of Whitehorse
Product:	Zinc and lead concentrate
Mill Capacity:	11 000 t per day
Tonnes Milled:	Nil
Reserves:	24.5 million t (minable open pit, Dec. 31, 1981)
Reserve Grade:	2.9% lead, 4.4% zinc, 35 g silver per t
Employees:	244 (average for operating period)

United Keno Hill Mines Limited

The company resumed its silver mine and mill operation in the Elsa area (a) on July 18, 1983, after being closed on July 15, 1982, because of low metal prices and a substantial operating loss. Operations commenced at a planned production rate of 5 050 t per month compared with 7 371 t per month a year earlier. A workforce of 146 is required to support the new operating rate compared with 220 workers in 1982. Underground production was concentrated at the Husky, Elsa, Ruby and No Cash Mines, the richest mines in the Keno Hill mining camp, as well as the Silver King and Hector Fault open pit mines. The Bermingham ore stockpile also provided mill feed.

During the year overburden drilling indicated a new silver ore zone on the Silver King property and two 1.5 m-wide veins were outlined. At year's end, drilling was being conducted to define ore tonnage in the new veins.

Type:	Underground and open pit
Location;	Keno Hill area
Product:	Silver-bearing lead and zinc concentrate
Mill Capacity:	450 t per day
Tonnes Milled:	29 596
Reserves:	200 000 t (March, 1984)
Reserve Grade:	840 g silver per t
Employees:	146 (average for operating period)

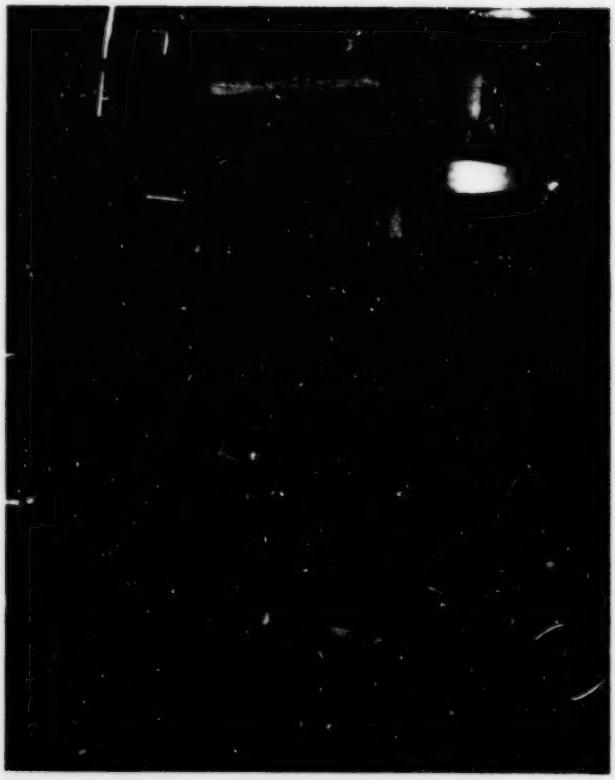
Small Lode Mining Operations and Mine Development

Archer, Cathro and Associates Limited under an agreement with *United Keno Hill Mines Limited* produced 390 t of high-grade silver ore, grading 7.89 kg silver per t and 35 per cent lead, from the Sadie Ladue vein (8) in the Keno Hill area. The ore was mined by open pit and trucked to the United Keno Hill mill where the ore was milled.

In the Rogue River area, 160 km north of Faro, *Dawson Eldorado Gold Explorations Ltd.*, in a joint venture with *Silvercrest Resource Corporation*, produced 680.25 t of hand-cobbed silver ore from several veins on the PLATA property (2). The ore (599 t grading 4.25 kg silver per t and 63% lead) was airlifted to Ross River for overland transport to the smelter.

Springmount Operating Company advanced its underground workings on the old Silver Spring Mine (8), in the Keno Hill area. The company mined 25 t of high grade lead-silver ore from underground and 81.5 t of lead-silver ore from a trench on surface at its Mount Keno Mine (8).

West of Carmacks, *Arctic Red Resources Corporation* continued work on the Laforma Mine (12). Some 152 m of drifting was completed on No. 4 level, a raise was rehabilitated and diamond drilling was conducted to test for reserves below No. 4 level.



Prospecting rocker used for placer deposit evaluation.

Placer Mining

Gold production from Yukon's 260 placer mine operations increased 28 per cent in 1983 to reach 2 932 kg (94 258 troy oz) of crude or impure gold claimed for royalties compared with 2 290 kg (73 641 troy oz) in 1982. Statistics Canada reported an additional 76 kg of placer gold which was sold to Yukon jewelry manufacturers or forwarded to gold refineries in 1983.

Staking activity related to placer mining decreased during 1983. There were 2 605 new claims and 521 new leases for 1 067 km staked to December 31, 1983, compared with 3 969 new claims and 294 new leases during 1982. There were 15 060 placer claims, 416 placer leases and 12 dredging leases in good standing at year's end. It is estimated that placer mining operations employed 750 persons in 1983. This compares with 650 seasonally employed persons in 1982.

Among the larger producers, *Queenstake Resources Ltd.* produced 326.5 kg of raw gold from its dredge and sluice-box operations on Clear Creek, Black Hills Creek and Sixty Mile River, all in the Dawson area (48). This raw gold was refined to 257 kg of fine (pure) gold. The *Teck Mining Group* recovered 297.6 kg of raw gold on its Sulphur Creek operation near Dawson. Both operations involved considerable pre-development work before commencing the processing of pay dirt.

Three underground placer mines operated in 1983, two in the Klondike area (48) and one in the Sixty-mile area (49). *Jackson Hill Ventures-Universal Exploration* drove an adit into Jackson Hill (48) advancing 291 m between January and March 1983 and mined about 13 000 cubic metres. *Main Street Mining* worked underground on Dago Hill (48) between January and March, 1983, advancing 488 m. Some 7 417 cubic metres were mined. The operation started up again in November, 1983. *Chumar Placers* operated its Miller Creek Mine (49) from January to April 13, 1983, and mined approximately 1 200 cubic metres of frozen gravel. The company resumed mining on October 6, 1983.

Queenstake Resource's dredge, Clear Creek (115P).

Outlook

Prospects for 1984 remain uncertain as improved zinc, lead, tungsten, and silver prices are required to bring full recovery and renewed growth to the lode mine industry. Beyond the prospect of future capacity production of zinc and lead concentrate at *Cyprus Anvil's* Faro Mine, the most important large scale project on the horizon is the development of *Amax of Canada Limited's* Mactung Mine. This $171 million mine and mill project on the NWT-Yukon border could be on stream by late 1986 or 1987, at an initial scale which will depend on world tungsten prices and demand. Technical and engineering studies are continuing. A production decision could be made in 1984 if tungsten markets show sufficient signs of recovery.

The issue of the federal government's draft (proposed) Yukon Placer Mining Guidelines, governing water use in Yukon placer mining operations is expected to be resolved in 1984. The draft guidelines were reviewed at public hearings held at five Yukon communities between Sept. 7 and Nov. 8, 1983. The report of the Public Review Committee on Yukon Placer Mining Guidelines was submitted to the Minister of Indian and Northern Affairs, Minister of Fisheries and Oceans and Minister of the Environment in January, 1984, for their consideration in the development of an appropriate regulatory regime.

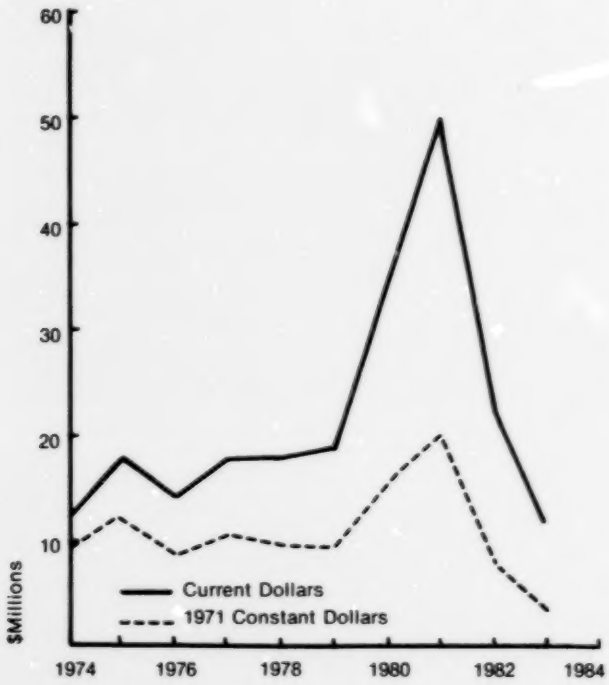
Mineral Exploration

Mineral exploration expenditures continued to decline during 1983 to an estimated $11 million compared with $22 million in 1982 and $50 million in 1981. The year was characterized by low levels of property work. The most active areas were in the Wheaton River area, south of Whitehorse, for gold-silver deposits, and in the Rancheria area, west of Watson Lake, for shale-hosted silver-lead-zinc deposits.

Table 2.
Quartz Claims Recorded in Yukon, 1982 and 1983

District	1983 Claims Recorded	1982 Claims Recorded
Whitehorse	1 675	981
Dawson	977	538
Mayo	540	408
Watson Lake	1 418	1 852
Total	4 610	3 779

Figure 1
Mineral Exploration Expenditures
Yukon Territory



Claim Staking

Mineral (quartz) claims staked and recorded during the year with comparative figures for 1982 as given in Table 2.

The total quartz claims in good standing at year's end 1983 was 47 094, down from 52 634 at year's end 1982.

During 1983, 68 properties were explored, of which 25 were explored for precious metals, 22 for lead and zinc, 13 for molybdenum, 10 for tungsten and four for copper.

A list of exploration companies active in the Yukon Territory during 1983 is given in Table 8 and locations of those activities are shown by corresponding numbers on the Yukon map.

Exploration Projects

Gold and Silver

Silver-lead-zinc exploration was particularly active in the Rancheria area, north of the MIDWAY shale hosted silver-lead-zinc deposit, which is located across the territorial boundary in northern British Columbia.

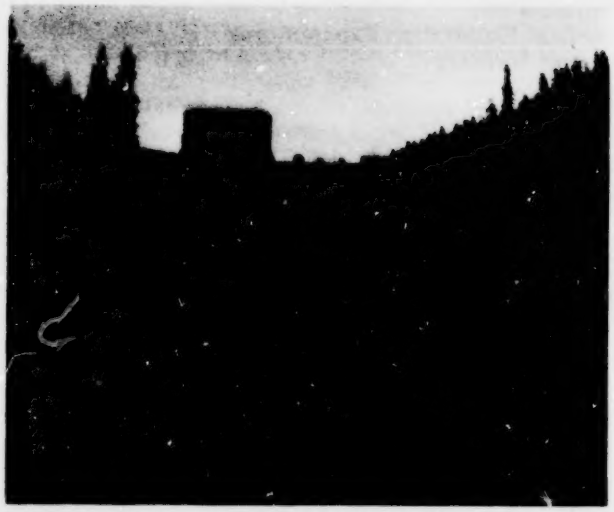
Butler Mountain Minerals Corporation conducted a diamond drill program on the YP property (29). Six holes were drilled and intersected thin stringers of pyrite, galena and sphalerite mineralization in quartz porphyry breccia. Nearby, *Getty Minerals Ltd.* drilled and trenched high grade silver-zinc-lead occurrences on the MEISTER claims (20). *Getty Minerals* also optioned the MR claims (20) from *Regional Resources Ltd.*, which cover stratiform silver-lead-zinc mineralization. Getty drilled, trenched and carried out geological, geochemical and geophysical surveys. *Beaver Resources Inc.* conducted geochemical and geophysical surveys on the WIND claims (29). *Hardy International Developments Inc.* drilled a mineralized area on the JACK claims (29). The first hole is reported to have intersected 6 m of disseminated galena and sphalerite.

In the Wheaton River area, *AGIP Canada Ltd.* continued work on its Mount Skukum property, KUKU and CHIEF claims (15). Property work included diamond drilling of 40 holes for a total of 4 545 m, geological mapping, rock geochemical sampling and bulldozing of trenches. Precious metal mineralization is associated with fissure-filled veins hosted in volcanic rocks of Late Cretaceous and Early Cenozoic age. Nearby, *AGIP* conducted exploration work on the GLENLIVET (15) and LATER claims (14).

To the east of Tally-Ho Mountain (16), *Tally-Ho Exploration* investigated an epithermal vein that had been mined for precious metals in the early 1900's. In the Mount Stevens area, near the Wheaton River, *Canadian Nickel Company Limited* staked the TON claims (16) as a follow-up to the geochemical anomalies generated in its 1974-75 reconnaissance programs.

East of Tagish Lake, on the northeast side of Jubilee Mountain (17), *Logan Mines Ltd.* trenched and sampled a gold-silver-copper showing in a limonitic shear zone in Cretaceous volcanic rocks.

South of Macmillan Pass, *Trident Resources Inc.* sampled quartz stringers and narrow zones of silicification in black argillite on the SEL claims (6) for silver and gold. Near the North Canol Road, *AGIP Canada Ltd.* continued exploration for precious metals in South Fork volcanic rocks. The RAGS and WENDY claims (7) were mapped and both soil and rock were geochemically sampled. Twenty-five km northeast of these claims, near Dragon Lake, *Canamax Resources Inc.* conducted a geological and soil geochemical program on the NURF claims (7). The claims cover minor gold and silver-bearing pyroxene-pyrrhotite pods and quartz-arsenopyrite veins in Hadrynian marble.



Processing plant used by B. and J. Johnson, Gay Gulch (Klondike area).

To the northwest of Macmillan Pass, *AGIP Canada Ltd.* staked and explored the DALL claims (3), covering an area underlain by Lower Earn Group clastics cut by a small Cretaceous intrusion. To the east of the DALL claims, the LEAF claims (3) were staked to cover Road River Group sedimentary rocks intruded by a Cretaceous stock. Both properties were mapped and soil and rock geochemical surveys were conducted.

To the east of the LEAF claims, the BRICK and NEVE claims (23), covering quartz-realgar-stibnite veinlets in acidic sills, were mapped and exploration work was conducted by *AGIP Canada Ltd.*

The WALL claims (5), near the Yukon-NWT border, north of Macmillan Pass, covering Hadrynian Grit Unit sedimentary rocks intruded by a Cretaceous granitic stock, were mapped and both soil and rocks were geochemically sampled by *AGIP Canada Ltd.*

Forty-five km northwest of Macmillan Pass, *Canamax Resources Inc.* conducted geological and geochemical surveys on the NUT claims (4). The claims cover a small quartz monzonite stock intruded into Paleozoic argillite, calcareous argillite and limestone. Galena and sulphosalt-bearing veins in brecciated and occasionally bleached hornfels partially ring the intrusion.

AGIP Canada's FIRE, ICE and SUN claims, located 75 km northwest of Macmillan Pass (3), were worked on by *Cominco Ltd.* Bismuthinite and arsenopyrite with associated gold occur as joint or fracture fillings in a syenite intrusion.

Southwest of Carmacks, *Kerr Addison Mines Limited* carried out a reconnaissance geology and geochemistry program over an area of felsic volcanic rocks on the HIK claims (52).

On Prospector Mountain, northwest of Carmacks, *Archer, Cathro and Associates Limited* continued exploration on the LILYPAD (11) and NUCLEUS (42) claims.

Canadian Nickel Company Limited explored two quartz-chalcedony vein structures on the RAIN claims (10) located northwest of Carmacks. The veins occur in Mesozoic granitic rocks, basement rocks and nearby Late Cretaceous Carmack Group volcanic rocks. Both zones contain anomalous gold, arsenic, mercury and barium values.

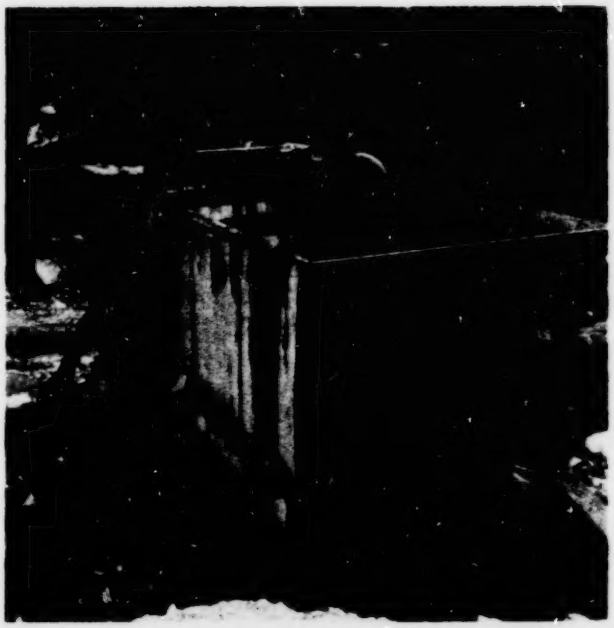
Further west, *Kerr Addison Mines Limited* explored the KOE claims (50) with a reconnaissance geology and geochemistry program. In the same area, *Tombill Mines Limited* worked on the Hayes property (50) where quartz veins with gold and base metal values occur in shear zones peripheral to a central rhyolite porphyry plug.

In the Klondike area, *Dawson Eldorado Gold Explorations Ltd.* in a joint venture with *Archer, Cathro and Associates Limited* mapped and sampled the LONE STAR gold property (9) and reopened the old adit. Eleven new claim groups were staked in the area. These were geologically mapped and soil sampled. The BRONSON claims (9) owned by *Cominco Ltd.* were mapped and geochemically sampled.

The *Dawson Syndicate* conducted geochemical and geophysical surveys on the SYNDICATE, DAWSON, WILLIAM and other claims, west of Dawson (51). Several areas anomalous in gold were outlined.

In the Keno Hill area, *Island Mining and Explorations Co. Ltd.* conducted a magnetometer survey and a seven hole drill program totalling 1 450 m on its MAG claims (8).

In the northern Yukon, *Rio Alto Exploration Ltd.* in joint participation with *E and B Explorations Ltd.* and *Kenton Natural Resources Ltd.* completed a 427 m long airstrip on the Rusty Springs silver-lead-copper vein property (1). A nine-km VLF-EM survey was conducted and two diamond drill holes were completed, totalling 488 m.



Vibrating "grizzly" at the processing plant used by B. and J. Johnson, Gay Gulch (Klondike area).

Zinc - Lead

North of Watson Lake, *Kerr Addison Mines Limited* drilled five holes and carried out a geophysical survey on its GE claims (53). In the Hoole River area, southeast of Ross River, *Canamax Resources Inc.* mapped and soil sampled the ZOO and ZAP claims (26). The claims cover disseminated to laminated sphalerite and galena in barite lenses within a Mississipian fragmental volcanic unit.

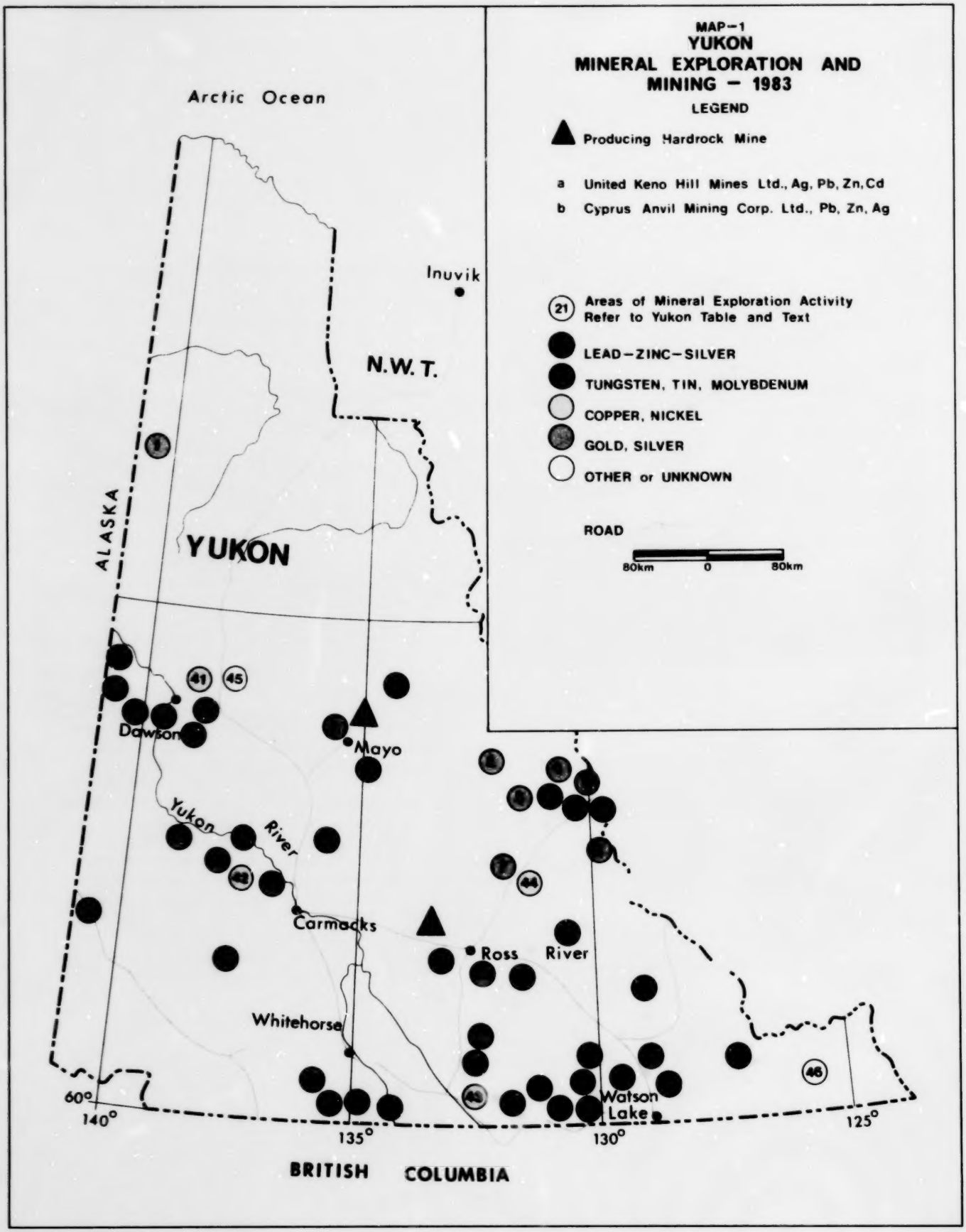
North of Teslin, *Cambac Resources Ltd.* conducted geochemical and VLF-EM and pulse-EM surveys on the BAR property (27). Stratiform lead, zinc, silver and barite mineralization is hosted in Upper Paleozoic shale and chert.

Southeast of Ross River, *Hudson Bay Exploration and Development Co. Ltd.* conducted an overburden drill program on its Pelly Banks property (25) to test EM conductors. The company had previously intersected very narrow bands of galena-sphalerite in one hole in this area.

In the Clear Lake area, *Cominco Ltd.* drilled one hole totalling 149 m on its TUM property (22). In the same area, *Getty Minerals Ltd.* continued work on its Clear Lake property (22) where three drill holes drilled in 1982 intersected numerous zones with pyrite, sphalerite and occasional galena hosted in shale and volcanic rocks.

At Macmillan Pass, *Cominco Ltd.* continued work on the HASTEN, BASIN and FETCH claims (24) where one hole of 302 m was drilled in the HASTEN claims. Some 16 km to the northwest on the NIDD claims (24), minor sphalerite and galena mineralization occurs in sedimentary rocks of the Road River Formation and Earn Group. *Cominco* conducted geochemical, magnetometer and Max-Min EM surveys and diamond drilled five holes totalling 106 m. Near the North Canol Road, *Hudson Bay Mining and Smelting Co. Limited* completed two large trenches on its TOM zinc-lead-silver property (24).

In the Wernecke Mountains, 115 km northeast of Mayo, *Acheron Resources Limited* geologically mapped, collected soil samples and trenched on the BUD and DAGO claims (21) for zinc-silver-lead mineralization.


MAP–1
YUKON
MINERAL EXPLORATION AND MINING – 1983
LEGEND
Producing Hardrock Mine
a United Keno Hill Mines Ltd., Ag, Pb, Zn, Cd
b Cyprus Anvil Mining Corp. Ltd., Pb, Zn, Ag
21 Areas of Mineral Exploration Activity Refer to Yukon Table and Text
LEAD–ZINC–SILVER
TUNGSTEN, TIN, MOLYBDENUM
COPPER, NICKEL
GOLD, SILVER
OTHER or UNKNOWN
ROAD
80km 0 80km
Arctic Ocean
Inuvik
N.W.T.
ALASKA
YUKON
Dawson
Mayo
Yukon River
Carmacks
Ross River
Whitehorse
Watson Lake
60°
140°
135°
130°
125°
BRITISH COLUMBIA

Processing plant used by Punters Gold Exploration, Clear Creek (115P).

Tungsten - Tin

In the Rancheria area, *Canamax Resources Inc.* worked on the HOT claims (39) which cover a hornfels and skarn zone. Two holes totalling 576 m were drilled and the holes intersected scheelite and molybdenite mineralization. To the northwest, *Archer, Cathro and Associates Limited* conducted a magnetometer survey and trenched on the OBVIOUS claims (40). Irregular and discontinuous skarns with an average grade of about 0.4 per cent WO_3 occur in near the Nisutlin Batholith.

East of Francis Lake, *A and M Exploration Ltd.* explored the RIETTA claims (35), which contain tungsten-bearing skarns along the contact of a quartz monzonite intrusion.

East of the North Canol Road, in the Otter Creek area, *Canamax Resources Inc.* conducted a geological and geochemical survey of the NARL claims (44), where weak soil anomalies of base metals, silver and tungsten occur over hornfels zones.

Southeast of Mayo on Kalzas Mountain, *Union Carbide Exploration Company Ltd.* drilled 668 m on its WOLF, DAVID, PAT and BLACKIE claims (33). Wolframite occurs in a quartz vein swarm and quartz-stockwork in Grit Unit rocks.

In the Rancheria area, *Du Pont Canada Exploration Ltd.* conducted a detailed magnetometer survey over the MC (SWIFT), SLIP (37) and VAL A claims (38). The VAL A claims were trenched to expose cassiterite in skarns along the contact with the Seagull Batholith. Northeast of Teslin Lake, *D.C. Syndicate* conducted geological, IP, pulse EM and trenching programs on the ORK claims (36), to define tin-copper-silver mineralization in skarn and disseminated sulphides in altered quartzite.

Northwest Territories

Mineral Production

Mineral production in the Northwest Territories during the calendar year 1983 was valued at $532 million compared with $468 million in 1982. Despite the increase in mineral production value, the continuing economic recession and concomitant low prices for base metals and tungsten combined to make 1983 a difficult year for some mines and mining communities in the territories. Gold production remained the bright spot in the industry, with a 67 per cent increase in production value from $91 million in 1982 to $153 million in 1983. The value of tungsten production (WO_3) declined by $24.6 million because of the 10-month shutdown of *Canada Tungsten's* mine.

Eight mining companies treated ore from 11 mines at 10 milling plants. Falling lead and zinc prices forced *Pine Point Mines Limited* to shut down on January 2, 1983. However, the mine resumed operation on June 15, 1983. Similarly, uneconomic tungsten prices forced *Canada Tungsten Mining Corporation Limited* to shut down its Cantung mine and mill operation at the end of January 1983. The mine resumed production on November 28, 1983. Gold production dropped at *Cominco's* Con Mine because of a two-month strike that lasted from mid-July to mid-September, 1983. *Giant Yellowknife Mines Limited* cut back gold ore mining production at its Yellowknife operation by 25 per cent at the end of March to extend the life of ore reserves.

Among relatively new producers, both *Echo Bay's* Lupin Mine and the Cullaton Lake Mine increased gold production. *Echo Bay Mines Ltd.* increased its mill capacity by 20 per cent from 900 to 1100 t per day. *Cullaton Lake Gold Mines Ltd.*, following a successful production year, plans to increase mill capacity to approximately 360 t per day in 1984 to accommodate ore production from its new Shear Lake Mine. In August, *Giant Yellowknife Mines Limited* commenced operations at the Salmita gold mine. Ore from Salmita was milled at the rehabilitated Tundra mill, 5 km to the south of the Salmita Mine. After a two-year period of limited production but intensive underground development and exploration, *Terra Mines Ltd.* doubled the capacity of its Camsell River silver mill from 225 to 500 t per day. In the High Arctic, operations at *Cominco's* Polaris Mine and the *Nanisivik* Mine continued successfully during the year despite low lead and zinc prices. The Polaris Mine concluded its first full year of operations by producing more concentrates than its rated capacity.

Production from the three lead-zinc mines, Pine Point, Polaris and Nanisivik, together increased 7.1 per cent for lead and 4.7 per cent for zinc compared with the previous year. This production was achieved in spite of the fact that *Pine Point Mines Limited* was closed for six months.

The mineral industry of the Northwest Territories accounted for 96.9 per cent of the tungsten, 26.5 per cent of the lead, 23 per cent of the zinc, 12.9 per cent of the gold and 4.6 per cent of the silver produced in Canada during 1983. The production value accounted for 6.5 per cent of the value of Canada's metallic mineral production compared with 5.6 per cent in 1982.

Operating mines and mills in the Northwest Territories employed 2,369 persons at the end of December, 1983. Of the 765 employees laid off by the closing of the Pine Point Mine and the Canada Tungsten Mine, some 662 were re-employed when the mines reopened later in the year.

Development

At year end 1983, *Cullaton Lake Gold Mines Ltd.* moved forward with preproduction development of the Shear Lake gold mine located some 5 km north of the Cullaton Lake Mine. A decline was driven through seven gold-bearing zones and drifts were extended from the decline toward the main shear zone, which is the new production target zone.

At *Cominco's* Ptarmigan Mine, 20 km by road northeast of Yellowknife, ramping, drifting and bulk sampling were conducted. Despite encouraging results, a production decision was postponed because the Con mill was operating at capacity to process ore from the Con Mine.

Cadillac Explorations Limited's base metal-silver property, at Prairie Creek, on which a mine and mill construction was near completion during 1981, was placed on hold in mid-1982 without achieving initial production. At year end 1983, no new developments which would bring the mine into production during 1984 were apparent.

By July 1983, *Terra Mines Limited* completed 610 m of decline, raise and lateral development on its Bullmoose (TA) gold property, 80 km southeast of Yellowknife. Some 1 525 m of underground drilling on the No. 4 vein increased reserves to 630 000 t grading 10.6 g gold per t compared with previous reserves of 22 575 t grading 10.57 g gold per t. The company hopes to prove sufficient reserves to bring the property into production. Overall costs of 1983 exploration-development at Bullmoose amounted to approximately $3 million.

Mines

Canada Tungsten Mining Corporation Limited

Canada Tungsten Mining Corporation's Cantung Mine (a)* produced 1 491 t of tungsten trioxide (WO_3) contained in concentrate compared with 2 925 t of tungsten trioxide (WO_3) in 1982. On January 22, 1983, mine production was suspended because of a sharp drop in tungsten prices during 1982 and mounting inventories. On November 28, 1983, the mine and mill resumed operation at a reduced throughput of 450 t per day or about one-half of full mill capacity. Tungsten prices remained low and fluctuating at year's end. However, reduced world tungsten inventories and market signals indicated some anticipated resurgence in tungsten demand. In December 1983, 145 mine workers were employed at the mine compared with a previous mine work force of 246 in 1982.

During the period when the mill was shut down, the company kept part of the mine work force employed in underground development and exploration.

Type:	Underground
Location;	Tungsten
Product:	Tungsten in scheelite concentrate
Mill Capacity:	1 000 t per day
Tonnes Milled:	36 001
Reserves:	2.72 million t (Dec. 31, 1983)
Reserve Grade:	1.32% tungsten trioxide
Employees:	147 (average for operating period)

*numbers of letters in parantheses indicate the location of the property on map in centerfold.

Cominco Limited - Con Mine

Cominco Ltd.'s Con Mine (c) ceased mine production during a strike that lasted from July 14 to September 16, 1983. Wages, holidays and taxation of northern benefits were the main issues. Because of the strike, the tonnage of ore milled decreased to 189 800 t in 1983 compared with 212 400 t during 1982. The mine produced 2 193 kg of gold (70 500 troy oz).

A decision was made to deepen the Robertson Shaft by 247 m to 1 900 m to provide four more working levels and the opportunity to explore at greater depth. The $9 million project is scheduled for completion in 1985.

Type:	Underground
Location:	1.4 km south of Yellowknife
Product:	Gold, silver
Mill Capacity:	550 t per day
Tonnes Milled:	189 800
Reserves:	1.7 million t (Dec. 31, 1983)
Reserve Grade:	15.1 g gold per t
Employees:	307 (average for year)

Cominco Limited - Pine Point Mine

Pine Point Mines Limited (b), controlled by Cominco Ltd., shut down its Pine Point mining and milling operation from January 2 to June 15, 1983. The closure resulted from depressed zinc and lead prices and high operating costs, which made operations uneconomic. The mine reopened after the company received wage concessions from the mine workers union, a rail rate reduction from CN Rail (Canadian National Railways) and lower smelter treatment charges. In addition, the federal government provided assistance under Section 38 of the Unemployment Insurance Act (UIA) Program and the territorial government provided a top up to the UIA Program funding. Also, Northern Canada Power Commission reduced electrical power costs to the mine. Pre-development work to remove overburden from a new open-pit mine containing high-grade ore was funded in part by the government contributions. By early 1984 most of the government assistance had been discontinued. In December 1983, 545 persons were employed at the mine.

Rising mining costs and lower metal prices necessitated the removal of uneconomic ore from reserves. The company increased its average reserve grade from 2.4 per cent lead and 6.1 per cent zinc in 1982 to 2.7 per cent lead and 6.3 per cent zinc in 1983, thereby removing 7.1 million t from its reserves.

Type:	Open pit
Location:	Pine Point
Product:	Lead, zinc
Mill Capacity:	10 000 t per day
Tonnes Milled:	893 329
Reserves:	23.6 million t (Dec. 31, 1983)
Reserve Grade:	2.7% lead and 6.3% zinc
Employees:	535 (average for operating period)

Cominco Limited - Polaris Mine

Cominco's Polaris zinc-lead mine (i) on Little Cornwallis Island concluded its first full year of operation. Concentrate containing 119 627 t of zinc and 35 558 t of lead was produced in 1983 compared with 64 773 t of zinc and 25 310 t of lead during the previous year. Production was 217 100 t of zinc concentrate and 51 100 t of lead concentrate, well in excess of design capacity of the mill. Mill throughput increased to 829 000 t in 1983 compared with 469 700 t in 1982. Nine shipments were made to Europe during the shipping season from August to late October, totalling 183 500 t of zinc concentrate and 41 400 t of lead concentrate.

Type:	Underground
Location:	100 km northwest of Resolute
Product:	Zinc, lead
Mill Capacity:	2 100 t per day
Tonnes Milled:	829 000
Reserves:	16.9 million t (Dec. 31, 1983)
Reserve Grade:	4.1% lead, 14.8% zinc
Employees:	220 (average for year)

Table 3
Mineral Production of Operating Mines, Northwest Territories, 1982 and 1983

Company, Mine and Commodity	1983 t	1983 kg	1982 t	1982 kg
Canada Tungsten Mining Corp. Ltd.				
tungsten trioxide	1 491		2 925	
Cominco Ltd.				
Con Mine				
gold		2 193		2 471
silver		460		603
arsenic trioxide	250		—	
Pine Point Mine				
zinc	67 643		8 981	
lead	23 203		69 037	
Polaris Mine				
zinc	119 627		64 773	
lead	35 358		25 310	
Cullaton Lake Gold Mines Ltd.				
gold		1 147		788
silver		24		373
Echo Bay Mines Ltd.				
Lupin Mine				
gold		3 670		34
silver		287		—
Giant Yellowknife Mines Ltd.				
Giant Mine				
gold		1 944		2 258
silver		552		452
arsenic trioxide	732		1 780	
Salmita Mine				
gold		165		—
silver		32		—
Nanisivik Mines Ltd.				
zinc	61 042		70 938	
lead	6 396		13 947	
silver		26 225		30 160
Terra Mines Ltd.				
silver		45 539		26 717
copper	115		9.5	
lead	181		—	
zinc	118		—	

Sources: Department of Indian Affairs and Northern Development and the Government of the Northwest Territories.

Cullaton Lake Gold Mines Limited

The Cullaton Lake Mine (h) of Cullaton Lake Gold Mines Limited officially reached full production on January 1, 1983. The mine commenced gold production in October 1981, but operational problems prevented the mill from attaining design mill capacity. In mid-1982 Camchib Resources Inc. was brought in to manage the project and the operational difficulties were resolved. In 1983, 102 035 t of ore were milled compared with 66 123 t in 1982. Gold production in 1983 was 1 147 kg (36 878 troy oz) compared with 788 kg (25 335 troy oz) in 1982.

Toward year's end, the company was progressing on preproduction development of its Shear Lake gold deposit, located 5 km north of the Cullaton Lake Mine. A 427 metre-long decline was driven through seven new gold-bearing zones and drifts were extended from the decline toward the main shear zone, which is the production target. With the development of the new Shear Lake Mine exceeding expectations, the company plans to increase mill capacity at the Cullaton Lake mill to about 360 t per day in 1984 at a cost of $2 million. The net result should be an increase in gold production to approximately 1 866 kg (60 000 troy oz) annually.

Ore reserves at Shear Lake are estimated at more than 900 000 t to the 183 m horizon, at grades equal to that of the Cullaton Lake Mine. If reserves can be further increased the company may decide by the end of 1984 to expand the mill to a capacity in excess of 450 t per day.

Type:	Underground
Location:	Cullaton Lake, Keewatin District
Product:	Gold, silver
Mill Capacity:	300 t per day
Tonnes Milled:	98 553
Reserves:	154 221 t (October 1, 1983, not including Shear Lake)
Reserve Grade:	17.1 g gold per t
Employees:	148 (average for year)

Echo Bay Mines Ltd. - Lupin Mine

Successful operations at the Lupin gold mine (g) during its first full year of production prompted Echo Bay Mines Ltd. to increase its mill capacity by 20 per cent from 900 to 1100 t per day. The decision to expand mill capacity was based on an upward revision of ore reserve estimates to 3.08 million t grading 13.6 g gold per t. The mine recorded full sustained production capacity in October 1982. In February 1983, the company completed a 600 km winter road from Yellowknife to the mine site for winter resupply.

Mill throughput during 1983 reached 331 218 t compared with 199 251 t during the previous year. Production in 1983 amounted to 3 670 kg of gold (118 000 troy oz) compared with 34 kg (1 093 troy oz) in 1982.

Type:	Underground
Location:	400 km northeast of Yellowknife
Product:	Gold, silver
Mill Capacity:	1 000 t per day
Tonnes Milled:	331 218
Reserves:	3 084 000 t
Reserve Grade:	13.6 g gold per t
Employees:	340 (average for year)

Giant Yellowknife Mines Limited - Giant Mine

Giant Yellowknife Mines Limited produced 1 944 kg of gold (62 505 troy oz) in 1983 compared with 2 258 kg (72 597 troy oz) in the previous year at its Giant Mine (c). The decline in gold production resulted from a planned reduction in mill throughput tonnage of 25 per cent beginning in the second quarter of 1983. The cutback, designed to extend the life of ore reserves, was achieved by cutting back on the underground tonnage mined, operating on a five-day milling week and reducing the workforce through attrition, early retirement and reduction of the work force to 280 employees from 315. Ore grades were decreased to 7.89 g of gold per t in 1983 compared with 8.23 g per t in 1982. Ore reserves were increased by 424 000 t. Most of the new ore was defined through underground development and drilling of known mineralized zones.

Type:	Underground and open pit
Location:	2.4 km north of Yellowknife
Product:	Gold, silver
Mill Capacity:	1 000 t per day
Tonnes Milled:	296 650
Reserves:	1 016 047 t (Dec. 31, 1983)
Reserve Grade:	7.89 g gold per t
Employees:	292 (average over year)

Giant Yellowknife Mines Limited - Salmita Mine

Giant Yellowknife Mines Limited commenced mill production at its Salmita Mine (e) in August, 1983, and the mine was officially opened in December, 1983. Mine development included driving a decline to the 250 m level and exploration drilling below the 250 m level. The mill of a former gold producer, Tundra Gold Mines Ltd., located 5 km to the south of the Salmita Mine, was purchased and rehabilitated to provide 150 t per day of mill capacity. Much of the equipment and supplies to the mine were hauled over a winter ice road from Yellowknife. The gold concentrate from the Tundra mill is shipped to the Giant Mine plant at Yellowknife for refining. The project cost amounted to $11.1 million, well under the projected development cost of $13.9 million. Ore treated in 1983 during the tune-up phase yielded 165 kg of gold (5 116 troy oz).

Twelve underground exploration holes drilled below the fourth level (205 m below surface), established the continuation of the quartz vein to the eighth level (365 m depth). Four holes were also drilled to test the 'T' vein, a parallel structure to the main vein, with some encouraging results.

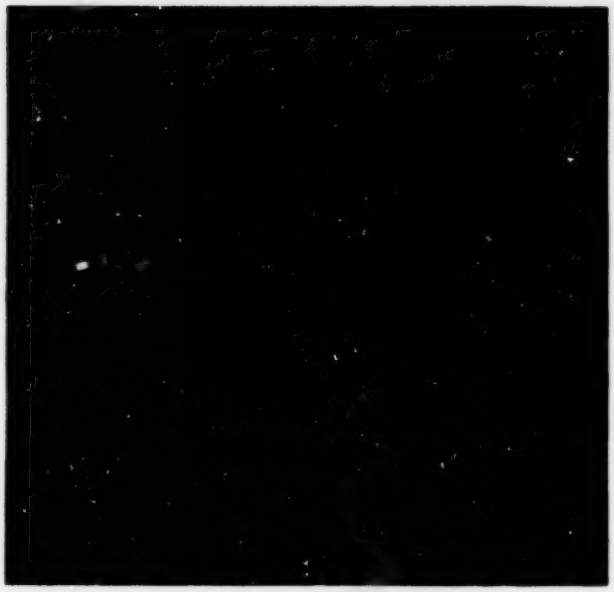
Reserves are sufficient to produce 1 244 kg of gold (40 000 troy oz) per year over 2.5 years.

Type:	Underground
Location:	250 km northeast of Yellowknife
Product:	Gold, silver
Mill Capacity:	150 t per day
Tonnes Milled:	11 926
Reserves:	105 233 t (Dec. 31, 1983)
Reserve Grade:	28.11 g gold per t
Employees:	84 (average for year)

Nanisivik Mines Ltd.

Nanisivik Mines Ltd. (f) milled 615 561 t of zinc-lead-silver ore in 1983 compared with 633 628 t in 1982. Concentrate production contained 6 396 t of lead, 61 042 t of zinc and 26 225 kg of silver. In the fall of 1982, the company was forced to store a shipload of concentrate at the mine because the last ship failed to reach the mine before ice blocked the passage. As a result, concentrate shipments to Europe during the 1983 shipping season reached a record 127 000 t compared with 102 000 t in 1982.

Type:	Underground
Location:	Arctic Bay, Baffin Island
Product:	Zinc, lead, silver
Mill Capacity:	1 800 t per day
Tonnes Milled:	615 561
Reserves:	4.4 million t (Jan. 31, 1983)
Reserve Grade:	10.5% zinc, 0.8% lead
Employees:	190 (average for year)



Trommel recovery plant, Barlow Creek (115P) Yukon.

Terra Mines Ltd.

Terra Mines Ltd. milled 45 287 t of ore at its Silver Bear mill in the Camsell River area (d) compared to 36 100 t in 1982. In late 1982, the Smallwood and Norex mines joined the Silver Bear Mine in supplying ore to the Silver Bear mill. In November, 1983, the company increased mill capacity from 225 t per day to 500 t per day at a cost of $750 000. During 1982 and 1983 extensive underground exploration and development work was conducted to prepare ore reserves for mining.

Type:	Underground
Location:	15 km south of Great Bear Lake on the Camsell River
Product:	Silver, copper, lead, zinc
Mill Capacity:	500 t per day
Tonnes Milled:	45 287
Reserves:	not available
Employees:	116 (average for year)

Outlook

Exploration and development expenditures in the Northwest Territories declined marginally in 1983 to an estimated $18 million from $22 million in the previous year. The level of exploration expenditures in 1984 will remain approximately the same. The shift from base metal and uranium exploration to gold exploration and development continued. The establishment of the Salmita gold mine (e) as a new producer in 1983, was followed by *Cullaton Lake* Mine's decision to bring its Shear Lake gold mine (h) into production in 1984 to augment gold output. Exploration and development work on *Terra* Mine's Bullmoose (26) gold property has been encouraging and a production decision may be forthcoming in 1984. Positive signals in the gold mining sector are the successful 1983 operations at relatively new mines, namely *Echo Bay's* Lupin and *Cullaton Lake's* B-Zone gold mines, and the continuing operation of the Con and Giant mines, at Yellowknife. In the longer term, *Amax of Canada Limited* is expected to bring its Mactung tungsten mine (17) on the NWT-Yukon border into production, perhaps during 1986 or 1987. The strengthening of zinc prices and marginal improvement in tungsten prices during the second half of 1983 indicated some metal market recovery, although general commodity market uncertainly continues.

Mineral Exploration

Mineral exploration expenditures continued to decline in 1983 to an estimated $18 million compared with approximately $22 million in 1982. Expenditures on gold exploration and gold property development amounted to about half of the total expenditure. Some $4 million was expended on exploration for base metals in the Pine Point District and near the Nanisivik Mine in northern Baffin Island. Expenditures on uranium exploration continued to decline and probably amounted to about $4 million.

In 1983, there were more gold exploration and development projects (53) than base metals projects (19) and uranium projects (25) combined (Table 4). Of a total of 115 properties explored, 44 took place in Slave geological province, in northeast Mackenzie District. Of these 44 projects, 40 were directed to gold exploration in Archean Yellowknife Supergroup rocks.

Figure 2
Mineral Exploration Expenditures
Northwest Territories

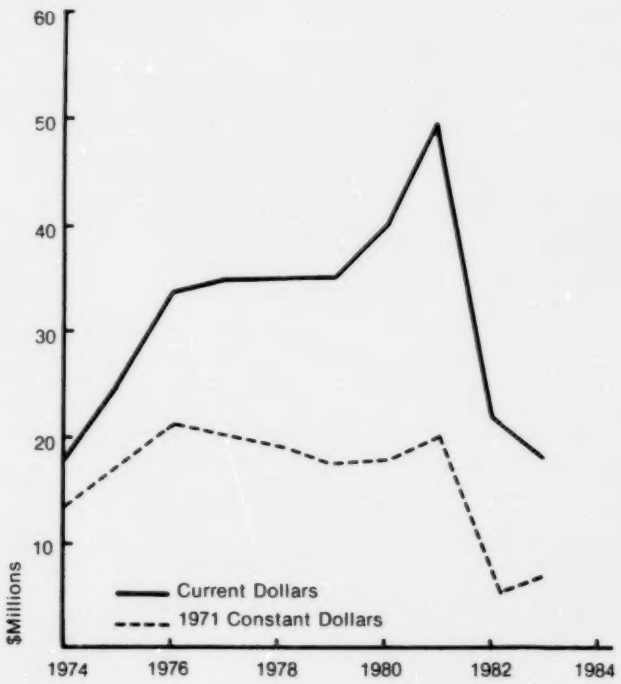


Table 4.
Exploration By Commodity, Northwest Territories, 1983

Commodity	Number of Properties Explored
Gold	53
Uranium	25
Silver	9
Base Metals	19
Tungsten and Other Metals	7
Coal	1
Iron	1
Total	115

Claim Staking

The staking of 547 claims during 1983 increased the area of new claim staking to 331 400 hectares compared with 159 400 hectares in 1982. However, the lapsing of 5 424 claims reduced the claimed area by 703 289 hectares and by December 31, 1983, the total claimed area stood at 40 952 claims in good standing covering 3 114 606 hectares.

Most of the increase in claim staking activities in 1983 was directed to areas of gold potential, particularly the Archean Slave Province, which extends from the north shore of Great Slave Lake northward to the Coronation Gulf. This region contains gold-bearing Yellowknife Supergroup volcanic and sedimentary rocks.

During the year, 218.5 thousand hectares of claims were staked in the Slave Province out of the total area staked of 331.4 thousand hectares. Barring a significant decline in the price of gold, exploration in areas of gold potential will continue to be vigorous over the next few years.

Ninety-six prospecting permits were issued in 1983, an increase of five over the number granted in 1982. The majority of the new permits are in the Arctic Islands.

Table 5.
Claims Staked in Northwest Territories, 1982 and 1983

Mining District Region	1983 Claims Recorded	1983 Area (Thousand Hectares)	1982 Claims Recorded	1982 Area (Thousand Hectares)
Arctic and Hudson Bay	88		106	
Arctic Islands		4.0		22.8
Keewatin District		83.9		83.4
Mackenzie	430		145	
Slave Province (Northeast Mackenzie)		218.5		20.7
Bear Province (Northern Mackenzie)		13.3		6.7
East Arm Subprovince		—		0.1
Pine Point District		0.1		0.7
Nahanni	29		35	
Cordilleran Province		11.6		25.0
Total	547	331.4	286	159.4

Diamond Drilling

Total surface diamond drilling amounted to some 141 000 m during 1983 compared to 136 494 m during the first 10 months of 1982. Drilling on two properties in the Pine Point zinc-lead district accounted for 45 per cent of all drilling. Several other large drill projects were conducted near operating mines.

Table 6.
Surface Diamond drilling in Northwest Territories, 1983

Region	Properties Drilled	Thousands of Meters	Properties with more than 20 holes: No. of Projects	Properties with more than 20 holes: Thousands of Meters
Arctic Islands	2	9.3	2	8.9
Churchill Province (Keewatin and S.E. Mackenzie)	14	22.8	—	—
Slave Province (Northeast Mackenzie)	26	22.9	3	8.0
Bear Province (Northern Mackenzie)	8	14.8	1	10.0
East Arm of Great Slave Lake	1	3.0	—	—
Pine Point District	2	63.3	2	63.3
Cordilleran Province (Nahanni)	4	4.9	—	—
Total	52	141.0	9	92.7

*Data includes drilling reported to February 15, 1984. Not all drilling reports were received.

A list of exploration companies active in the Northwest Territories during 1983 as given in Table 7 and locations of these activities are shown by corresponding numbers on the map in the centerfold.

Exploration Projects

Gold

Gold exploration, concentrated for the most part in Slave Province, northeast Mackenzie District, comprised half of the exploration projects in the Northwest Territories during 1983. The increased exploration activity was accompanied by an expansion of the mill capacity of the Lupin Mine (g), start up of the Salmita Mine (e) and encouraging results from underground exploration at Terra's Bullmoose Lake property (26).

In the Indin Lake (31) supracrustal belt, 175 km north-northwest of Yellowknife, *Esso Resources Canada Limited* conducted reconnaissance exploration.

Treasure Island Resources Corp. drilled eight holes totalling 917 m on the DAN 9 claims (31) on the south side of Treasure Island, Spider Lake, 232 km north-northwest of Yellowknife.

In the Russell Lake area (30), 75 km northwest of Yellowknife, *Host Ventures Ltd.* drilled 7 holes totalling 193 m of the DON claim, 4 km north of Slemon Lake. Gold mineralization was intersected within bands of sulphide mineralization in breccia zones.

Roxwell Gold Mines Ltd. mapped, sampled and diamond drilled on the MOS claims (30) at the south end of Mosher Lake.

MINERAL EXPLORATION AND MINING
NORTHWEST TERRITORIES — 1983

MAP-2

LEGEND

Producing Mines

a Canada Tungsten Mining Co. Ltd., W, Cu
b Pine Point Mines Ltd., Pb, Zn
c Giant Yellowknife Mines Ltd., Au, Ag
  Cominco Ltd.(Con Mine) Au, Ag
d Terra Mining & Exploration Ltd., Ag
e Giant Yellowknife Mines Ltd.
  (Salmita Mine) Au
f Nanisivik Mines Ltd., Pb, Zn
g Echo Bay Mines Ltd.,(Lupin Mine), Au
h Cullaton Lake Gold Mines Ltd., Au
i Cominco Ltd.,(Polaris Mine), Pb, Zn

100km 0 100km

Road

(12) Areas of Exploration Activity
Refer to N.W.T. Table and Text

URANIUM
GOLD, SILVER
ZINC, LEAD, COPPER
TUNGSTEN
LITHIUM, DIAMOND, IRON, BARITE, SOAPSTONE
COAL

Arctic Ocean
ALASKA
YUKON
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
Hudson Bay
GREENLAND
BANKS ISLAND
VICTORIA ISLAND
BAFFIN ISLAND
NORTHWEST TERRITORIES
Arctic Circle
Inuvik
Norman Wells
Mackenzie River
Coppermine
Cambridge Bay
Resolute
Baker Lake
Fort Simpson
Yellowknife
Pine Point
Fort Smith
54
51
52
21
85°
80°
75°
70°
65°
60°
120°
110°
100°
90°

Near Yellowknife at Negus Point (c), *Cominco Ltd.* drilled 37 holes on the Negus, PRW, PRWX claims and CAGEX fraction. These holes, totalling 1 240 m were drilled from the ice on Yellowknife Bay. At the Ptarmigan Mine (c), near Yellowknife, Cominco Ltd. mined 1 660 t of ore from a new decline to test an ore reserve block in the A vein, as part of the feasibility of reopening the mine. The ore was treated at the Con mill at Yellowknife. Production was 42.9 kg of gold.

Ardic Exploration and Development Ltd. conducted VLF-EM, magnetometer and IP surveys and sampled veins at the surface of the Thompson-Lundmark property (27), 80 km east of Yellowknife. This property produced gold intermittently during the 1940s.

Underground development, surface and underground diamond drilling at *Terra Mines Ltd.'s* Bullmoose Lake project (26), 80 km southeast of Yellowknife, was reported to have increased reserves on the No. 4 vein to 630 000 t grading 10.6 g gold per t compared with previous reserves of 22 575 t grading 10.57 g gold per t. Further exploration is planned to determine whether production is feasible.

Ethen Mines Ltd. erected a small mill, 4 km north-northwest of Bullmoose Lake (26), and processed a small tonnage.

Hidden Lake Gold Mines Ltd. dewatered the Ruth Mine shaft, near Chipp Lake (28) and resampled the gold-bearing vein.

Giant Bay Resources Ltd. drilled nine holes on the MAHE claim group on the northwest side of Knight Bay, Gordon Lake (29). A number of gold-bearing intervals were intersected.

Immediately north of Gordon Lake (29), *Newcan Minerals Ltd.* conducted VLF-EM, magnetometer and IP surveys and drilled a total of 1 528 m in 35 holes on the VEN group. A number of holes intersected gold values in a vein. The company also prospected the JANE claims, which adjoin the VEN group to the south.

"Shaker table" used for final separation of gold from heavy mineral concentrate.

Giant Yellowknife Mines Limited and *Noranda Exploration Company, Limited* in joint venture with *Getty Mines* were active in the Courageous Lake-Mackay Lake volcanic belt (e). *Giant Yellowknife* brought the Salmita Mine (e) into production and conducted exploratory drilling on the RED 24 claim north of the Salmita Mine mill, near the northern end of Matthews Lake; on the SALERNO 14 claim, 1 km east of the Salmita Mine; on the MAD 13 claim at the south end of Matthews Lake, near the Tundra Mine (e); and on the BS 1 claim, 3 km south-southeast from the southern end of Matthews Lake. Altogether 12 holes were drilled totalling 1 217 m.

About 1.5 km north of Matthews Lake (e), *Noranda Exploration Company, Limited* surveyed part of BERTHA 1 claim by IP, drilled 7 holes on the BERTHA 1 claim and two holes on the adjoining FAT 62 claim, for a total of 1 090 m.

American Chromium Limited surveyed the KR and TONY claim group (e), 8 km north-northwest of Noranda's KETZA 1 claim, by VLF-EM, magnetometer and geological mapping. Targets defined were drilled.

In the Back River belt (32), *Noranda Exploration Company, Limited* explored the SIDD 1-10 claims for gold-bearing metamorphosed iron formation by VLF-EM and magnetometer surveys. New claims were staked and a diamond drilling program was started in October. *Silver Hart Mines Ltd.* explored and drilled targets on the MATE claims on the Back River (32) and staked an additional 11 MATE claims. The adjoining area has been explored by *Cominco* and others since 1962 as the TOBY, GAS and SY claims. A three-man crew of *Esso Resources Canada Limited* explored the Reagan Lake and Back River areas (32). *Trigg, Woollett Consulting Ltd.* explored Prospecting Permit 973 near Index Lake (32) for the *Back River Joint Venture*.

In the Contwoyto Lake area, at and near the Lupin Mine (g), *Echo Bay Mines Ltd.* and several other companies explored for auriferous iron formation. *Highwood Resources Ltd.* managed work for a number of companies in the area and also staked large areas that were transferred to other companies. Companies with claims include *Aber Resources Ltd., Amhawk Resources Corporation, Great Bear Development Corporation, Highwood Resources Ltd., Kappa Resources Limited, Kamwood Resources Ltd., Viscount Resources Ltd., Wellington Resources Ltd.*, and *O.P. Resources Ltd.*

O.P. Resources Ltd. explored independently of Highwood Resources and its associates. The company prospected and diamond drilled its property 10.5 km southwest of the Lupin Mine (g). *Aber Resources Ltd.'s* FIN claims (g) were explored by VLF-EM, magnetometer, gradiometer and SP surveys. Four holes were drilled. Further to the southwest, *Kappa Resources Limited* drilled 4 holes to test a gold showing on the BARB claims (g).

Echo Bay Mines Ltd. drilled on its Lupin Mine lease and 13 holes were drilled 6 km south of the Lupin Mine on the DER 1 claim (g). Outside the Contwoyto Lake area, *Echo Bay Mines* explored the CUB 1 claim (33) between the northern arms of Itchen Lake and the SIK (previously FUZ A) claims and SKI claims (previously FUZ B claims), 20-25 km northeast of the CUB 1 claim (33). The company also explored the C claims on the east side of Contwoyto Lake, 25 km east of the Lupin Mine (g). The work in all cases was directed at locating gold-bearing iron formation targets. Large areas underlain by the Contwoyto Formation were staked.

Kidd Creek Mines Ltd. tested targets on the REN 24 claims near the Itchen River (34) by drilling 4 holes totalling 773 m. *Canuc Resources Inc.* drilled 1 520 m in several holes to test the North Vein on the Arcadia property (37) near Coronation Gulf.

In Keewatin District, *Inco Metals Ltd., Cullaton Lake Gold Mines Ltd., Suncor Inc.* and *Comaplex Resources International Ltd.* were active. *Inco Metals Ltd.* conducted ground geophysical surveys on claims on the Pork Peninsula (20) and investigated nearby areas.

Cullaton Lake Gold Mines Ltd. drilled approximately 6 300 m on the Shear Lake prospect and the B-Zone prospect near the Cullaton Lake Mine (h). A decline was completed on the Shear Lake Mine project.

Suncor Inc. explored at Mountain Lake (21) with Max-Min EM, magnetometer and IP surveys. Some 1 600 m of drilling were completed. *Comaplex Resources International Ltd.* investigated the precious metal potential of the Judge Sissons Lake (19) and Whitehills Lake (18) areas.

Golden Rule Resources Ltd. mapped and used lake sediment geochemical surveys in the Snowbird Lake-Ennadai Lake area (55) to locate gold mineralization in veins, in association with pyritic tuffaceous rocks and in sulphide facies-magnetite facies iron formation.

In the Cordilleran region, *Esso Resources Canada Limited* prospected its exploration permits (41), near a large Cretaceous intrusion, for gold and other precious metals. *Hudson Bay Mining and Smelting Co., Limited* prospected its Liard River permits (38) for placer gold.

Base Metals and Silver

Work continued in Slave Province in search of polymetallic volcanogenic massive sulphide deposits. *Aber Resources Ltd.* surveyed its AA and BB claims at Turnback Lake (29) by pulse EM. *Cominco Ltd.* resumed work on the RUN, FAST and XVM claims (48), south of Coronation Gulf where a grid was surveyed by EM. *Noranda Exploration Company, Limited* explored in the Hope Lake greenstone belt (47), where the company screened EM conductors on several claim groups by gravity surveys. Some 644 m of diamond drilling in 9 holes were completed.

In the Pine Point area, Interior Plains region, *Westmin Resources Limited* completed 6 080 m of drilling on the Slave Reef Project properties (b). *Pine Point Mines Limited* conducted extensive exploration work on its mineral leases (b) mainly by drilling and IP surveying. Total exploration drilling in the Pine Point District for both *Westmin Resources* and *Pine Point Mines* amounted to 63 000 m.

In the Cordilleran region, *Placer Development Limited* had good drilling results on the HUG lease (50). Nearby, *Alex Black* prospected the JAY claims (50) and found high grade samples bearing lead, zinc, gold and silver.

In the Arctic Islands, *Nanisivik Mines Ltd.* explored Area 14 (f), southeast of the Nanisivik Mine, and continued exploration in the mine area (f). *Panarctic Oil Ltd.* explored copper-silver targets in the Natkusiak volcanics of the Shaler Mountains region of Victoria Island (46).

Cominco Ltd. staked claims to cover Kalivik Island (44) northwest of the Polaris Mine. In the Arctic Islands, *Petro-Canada Ltd.* conducted reconnaissance exploration on its permit areas in southeastern Ellesmere Island (42) and northern Baffin Island (45) as well as eastern Devon Island (43).

Silver

Near Coronation Gulf, *Westsun Petroleum and Minerals Ltd.* acquired several claim groups (36) and explored near a recently discovered silver vein. South of Great Slave Lake, in the Talston River area (24), *Talston River Mines Ltd.* sampled argentiferous veins. In the Camsell River-Rainy Lake area (d), *Terra Mines Ltd.* continued diamond drilling at the Silver Bear Mine and drilled numerous holes on the Norex Mine-Smallwood Lake property (d). *Procan Exploration Ltd.* prospected and carried out geochemical sampling on several properties north of the Camsell River (35).

Uranium

In the Thelon Plain, southeast Mackenzie District, *Urangesellschaft Canada Limited* drilled over 1 000 m to test geochemical and geophysical anomalies in the Boomerang Lake area (10.) In the Keewatin District, *Urangesellschaft Canada Limited* drilled 1 200 m in the Thirty Mile Lake area (6) south of Baker Lake and 2 900 m in the vicinity of the Lone Gull deposit at Judge Sissons Lake (3), west of Baker Lake. Work at Long Lake (4) included 1 000 m of drilling. Surveys were conducted on claims southwest of Schultz Lake (3) and on claims east of Sand Lake (2). *PNC Exploration (Canada) Ltd.* explored claims and permits near Foster and Croft Lakes (9). The company also drilled and surveyed its KULT claims in the Nonacho-Thekulthili Lake area (12, 13). *Noranda Exploration Company, Limited* conducted ground surveys on its claims southeast of Baker Lake (5).

In Bear Province, *Anaconda Canadian Exploration Ltd.* drilled 3 505 m in 46 holes on the Bear Valley project (16) claims. *Uranerz Exploration and Mining Limited* mapped and prospected the Carousel Massif (14) and the Belleau Lake-Dumas Lake area (15).

Coal

In the Arctic Islands, *Petro-Canada Ltd.* mapped and sampled coal beds of the Tertiary Eureka Sound Formation in the Stenkul Fiord area (54), southern Ellesmere Island.

Iron Ore

Borealis Exploration Limited conducted geologic mapping and constructed an airstrip at its Roche Bay (52) iron ore property, Melville Peninsula.

Beryllium

Highwood Resources Ltd. conducted gravity and berylometer surveys to evaluate the beryllium potential of its tantalum-niobium-rare earth deposits on its Thor (53) property, in the Blatchford Lake area. Surface samples from three zones indicated economically significant beryllium. A 3 000 m drill program to test the T Zone commenced in October, 1983.

Tantalum Mining Corporation of Canada Ltd. conducted a geochemical survey at Otto Lake (27), north of the Thompson-Lundmark Mine. A tantalum-beryllium and tin-bearing pegmatite outcrops on the TABE claims at Otto Lake.

Tungsten

In Cordilleran region, *Meno Resources Ltd.* conducted aerial geophysical surveys on the SWAN claim (a), 45 km southeast of Tungsten. *Canada Tungsten Mining Corporation Limited* drilled about 3 000 m on the Baker and Redpath prospects (a) and both underground and surface drilling continued at the Cantung Mine (a).

Table 7
Exploration - Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
1	Uranerz	Garry Lakes	U
1	Kidd Creek	Garry Lakes	U
2	Urangesellschaft	Sand Lake	U
2	Uranerz	Sand Lake	U
3	Urangesellschaft	LONE GULL	U
3	Urangesellschaft	Schultz Lake	U
4	Urangesellschaft	Long Lake	U
5	Noranda	Baker Lake	U
5	Aberford	Bissett Lake	U
6	Urangesellschaft	Thirty Mile Lake	U
7	PNC	Marjorie Lake	U
8	Urangesellschaft	Nowleye Lake	U
9	PNC	Foster Lake	U
10	Urangesellschaft	Boomerang Lake	U
11	Uranerz	Powder Lake	U
12	PNC	KULT	U
13	PNC	KULT (Nonacho Lake)	U
14	Uranerz	Carousel Massif	U
15	Uranerz	Dumas Lake	U
16	Anaconda	MUNCH, BEAR, GNAW	U
17	Amax	MACTUNG	W
18	Comaplex	Whitehills Lake	Au
19	Comaplex	Judge Sissons Lake	Au
20	Inco	Pork Peninsula	Au
21	Suncor	Mountain Lake	Au
22	L. Anderson/W. Kizan	Rutledge Lake	Au, Ni
23	A. Larocque	La Loche Lake	Au
24	Talston River	Talston River	Au
25	Cominco	East Arm of Great Slave Lake	
26	Terra	TA (Bullmoose Lake)	Au
26	Ethen	Bullmoose Lake	Au
27	Ardic	Thompson-Lundmark	Au
27	Tantalum	TABE	Ta, Be, Sn
28	Hidden Lake	RUTH	Au
29	Giant Bay	MAHE	Au
29	Newcan	VEN, JANE	Au
29	Aber	AA, BB	Pb, Zn
30	Host Ventures	DON (Slemon Lake)	Au
30	Roxwell	MOS (Mosher Lake)	Au
31	Esso Resources	Indin Lake	Au
31	Treasure Island	DAN	Au
32	Esso Resources	Reagan lake	Au
32	Noranda	SIDD	Au
32	Silver Hart	MATE	Au

Table 7 (continued)
Exploration - Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
32	Trigg, Woollett	Index Lake	Au
33	Echo Bay	CUB	Au
33	Echo Bay	SIK, SKI	Au
34	Kidd Creek	REN	Au
35	Procan	Camsell River	Ag
36	Westsun	Coronation Gulf	Ag
37	Canuc	ARCADIA	Au
38	Hudson Bay	Liard River	Au
39	D. Turner	Nahanni Range	Au
40	prospectors	McMillan Lake	Au
41	Esso Resources	Skinboat Lake	Au
42	Petro-Canada	Ellesmere Island	Zn, Pb
43	Petro-Canada	Devon Island	Zn, Pb
44	Cominco	Kalivik Island	Zn, Pb
45	Petro-Canada	Borden Peninsula	Zn, Pb
45	Nanisivik	BART	Zn, Pb
46	Panarctic	Shaler Mountains	Cu, Ag
47	Noranda	MERK, DOG, CAN	Zn, Pb
48	Cominco	RUN, FAST, XVM	Zn, Pb
49	SEREM	SOLTICE SPIRIT	Zn, Pb, Au
50	Placer	HUG	Zn, Pb
50	A. Black	JAY	Pb, Zn, Ag, Au
51	DIAND	Prince of Wales Island	Soapstone
52	Borealis	Roche Bay	Fe
53	Highwood	Blatchford Lake	Ta, Nb, Be, REE
54	Petro-Canada	Stenkul Fiord	Coal
55	Golden Rule	Snowbird Lake	Au
a	Meno Resources	SWAN	W, Au
a	Canada Tungsten	BAKER, REDPATH	W
b	Pine Point	Pine Point	Zn, Pb
b	Westmin	Slave Reef Project	Zn, Pb
c	Cominco	NEGUS	Au
c	Cominco	PTARMIGAN	Au
d	Terra	ITLDO, MJ	Ag
d	Barons Oil	Rainy Lake	Ag
e	Giant	RED, TOUGH, MAD, BS	Au
e	Noranda	BERTHA, FAT	Au
e	American Chromium	KR, TONY	Au
f	Nanisivik	Area 14	Zn, Pb
g	Echo Bay	C, DER, BRI, PEN	Au
g	Bow Valley	FIN	Au
g	O.P. Resources	IFOR	Au
g	Aber/Highwood	FIN	Au

Table 7 (continued)
Exploration - Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
g	Kappa/Highwood	BARB	Au
g	Hemisphere/Viscount	AU	Au
h	Cullaton	Shear Lake	Au
h	Cullaton	COD, JUDY, NOBE	Au

Footnotes for Tables 7 and 8
(1) Table location is made with reference to corresponding numbers on Yukon and Northwest Territories Maps. Locations are approximate.

(2) Abbreviated name of the Company is used: Expl. (Exploration), Ltd. (Limited).

(3) Geographical areas are indicated by small print, whereas claims and groups are capitalized. Abbreviated words are: Peninsula (Pen), River (R), Lake (L).

(4) Metal(s) of primary importance defined by chemical symbols: copper (Cu), gold (Au), lead (Pb), tantalum (Ta), Lithium (Li), asbestos (Asb), molybdenum (Mo), silver (Ag), barium (Ba), cobalt (Co), tin (Sn), iron (Fe), tungsten (W), niobium (Nb), beryllium (Be), rare earth elements (REE), mercury (Hg), antimony (Sb) and uranium (U).

Table 8
Exploration - Yukon Territory

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
1	Rio Alto	Rusty Springs	Ag, Pb, Zn
2	Ebony/Dawson Eldorado	PLATA	Ag, Pb
3	AGIP	LEAF	Au
3	AGIP	DALL	
4	Cominco	SUN, FIRE, ICE	Au, Bi
4	Canamax	NUT	
5	AGIP	WALL	Au
6	Trident	SEL	Au, Ag
7	Canamax	NURF	Au, Ag
7	AGIP	WENDY, RAGS	
8	Archer, Cathro	SADIE LADUE	Ag
8	Island Mining	MAG	Ag
8	Springmount	Silver Spring	Ag
8	Springmount	Mount Keno	Ag
9	Dawson Eldorado/Archer, Cathro	LONE STAR	Au
9	Cominco	BRONSON	Ag, Pb, Zn, Cu
10	Canico	RAIN	Au, Hg, Ba
11	Archer, Cathro	LILYPAD	Ag, Pb
12	Arctic Red	LAFORMA	Au
13	Iona	KETZA	Ag, Pb, Zn
14	AGIP	LATER	
15	AGIP	WOOF, KUKU, CHIEF	Au, Ag
15	AGIP	GLENLIVET	Au
16	Canico	TON	
16	Tally-Ho	TH	Au, Ag
16	AGIP	TYCON	Au, Ag
17	Logan	JUBILEE	Au, Ag, Cu
18	Klondike Silver	ANT, BRU	
19	Cima	Mt. Hundere	Ag, Zn, Pb
20	Getty/Regional	MR, MEISTER	Ag, Pb, Zn
21	Acheron	BUD, DAGO	Zn, Pb, Ag
22	Getty	Clear Lake	Pb, Zn, Ag
22	Cominco	TUM	Pb, Zn
23	AGIP	BRICK, NEVE	Sb, As
23	Cominco	HESS	Zn, Pb, Ba
24	Cominco	NIDD	Zn, Pb
24	Aberford	JASON	Pb, Zn, Ag
24	Cominco	HASTEN, BASIN, FETCH	
24	Hudson Bay	TOM	Pb, Zn, Ag, Ba
25	Hudson Bay	PELLY BANKS	
26	Canamax	ZOO, ZAP	Zn, Pb
27	Cambac	BAR	Pb, Zn, Ag, Ba
28	Regional	LOGAN	Zn, Ag, Sn

Table 8 (continued)
Exploration - Yukon Territory

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
29	Butler Mountain	YP	Zn, Pb, Ag
29	Hardy International	JACK	Zn, Pb, Ag
29	Beaver	WIND	Ag, Pb, Zn
29	Regional	MID	Zn, Pb, Ag, Ba
30	Sulpetro	MEL EAST	Zn, Pb, Ba
31	Noranda	RAIL	W
32	Territorial Gold	GLAC	W, Au
33	Union Carbide	KALZAS	W
34	Amax	MACTUNG	W
35	A and M Exploration	RIETTA	W
36	DC Syndicate	ORK	Sn, Cu, Ag
37	DC Syndicate	JAR	Sn, Zn
37	Du Pont	SWIFT, MC	Sn, Zn
38	Du Pont	VAL	Sn, Zn
39	Canamax	HOT	W, Mo
40	Archer, Cathro	OBVIOUS	W
41	Noranda	MARN	Cu
42	Archer, Cathro	NUCLEUS	Cu
43	DC Syndicate	CAL	Cu
44	Canamax	NARL	Cu, Pb, Zn, Ag, W
45	Noranda	TAK	
45	A.J. O'Brien	AF	
46	Stubenberg	BEAV	
47	S. Goodlife	CAN	W
48	Jackson Hill	Klondike area	Placer Au
48	Main Street	Klondike area	Placer Au
49	Chumar	Sixtymile area	Placer Au
50	Kerr Addison	KOE	Au
50	Tombill	Hayes	Au, Pb, Zn
51	Dawson Syndicate	SYNDICATE, DAWSON	Au
52	Kerr Addison	HIK	Au
53	Kerr Addison	GE	Pb, Zn
b	Cyprus Anvil	TIE, FIRTH	Zn, Pb

Economic and Policy Analysis

The recent economic recession severely affected the mining industry world wide, causing a sharp decline in most metal prices. Many mining operations were not able to operate at such price levels and had to close for an indefinite period. Since competition is expected to accelerate in the coming years, operators have realized that their survival will depend upon their ability to reduce costs while increasing their productivity and efficiency.

In this issue of Mines and Mineral Activities, the major economic events that have affected the northern mining industry in 1983 and the response measures that were taken by some companies to improve their ability to survive in the long run are reported. A review of the most significant policy developments and issues relevant to the northern mining industry is made. Finally, an analysis of the competitive position of northern mines and their ability to compete in the future is presented in Appendix 1.

Overview of the Northern Mining Industry

During the second half of 1983, world metal markets began to improve slowly from recession levels in response to the economic recovery. Consequently, 1983, was a transitional year for the mining industry.

Mixed results were noticed in the northern mining industry during the year. In the first half, the final effects of the recession resulted in the closure of Pine Point Mines Ltd. (January 2) and of Canada Tungsten (January 21). Fortunately, the economic recovery began to be felt in the second half with the reopening of Pine Point (June 15), United Keno Hill (August 1) and Canada Tungsten (November 28).

An important factor in the mines re-opening was a recognition of the need for greater management/labour/government co-operation to ensure the long term economic viability and competitive position of some mature mines in the Northwest Territories and the Yukon. Significant management, operational and cost structure reorganizations were achieved at United Keno Hill, Canada Tungsten, Cyprus Anvil and Pine Point. These changes, in conjunction with anticipated better market conditions, allowed the reopening of the mine/mill operations at all of them except Cyprus Anvil which reopened on the basis of an advance stripping program.

An encouraging feature arising out of the recession has been the ability of some northern mines to compete under some of the worst economic conditions despite their remoteness. These included Cominco's Polaris Mine, Nanisivik Mines Ltd. and most gold producers in the NWT.

Yukon

The Yukon mining industry was still severely affected by the recession in 1983. For most of the first half of the year, the industry was almost non-existent as all lode mines were closed. Both the value of production at $59.4 million and employment at about 500 person-years, including placer mining employment, were at record lows.

The extent of the decline in mining activities in the Yukon was demonstrated by the dramatic reduction in its contribution to the total value of Canadian metallic mineral production. In 1983 it accounted for only 0.8 per cent compared with 2.45 per cent in 1982 and 3.76 per cent in 1980. With the decline in lode mining, the relative importance and stabilizing role of gold placer mining became more obvious during 1983. It accounted for 85 per cent of the total value of mineral production in the Yukon and for more than half of the employment. It was only with the full resumption of placer mining operations that some revival in activity was noticed. As a result of placer mining operations Yukon still contributed significantly to total Canadian gold production. In 1983, it accounted for 4.3 per cent of Canadian production. Yukon also accounted for 1.6 per cent of the silver production and 0.2 per cent of lead production.

Some positive events took place during the second half of the year which can be interpreted as forerunners of an improved situation. Following the successful negotiation of an agreement between Cyprus Anvil/Dome Petroleum and the federal government, Cyprus Anvil Mining Corporation (CAMC) recalled about one third of its employees at the end of May to carry out an advance stripping program. The agreement, which aims at improving the long-term viability of the mine at the same time as providing employment to a minimum of 210 persons, provides for a $50 million two-year advance waste stripping program. The cost is to be shared equally between the government and Dome. The $25 million government share is financed as follows: about $4 million under the UIC Section 38 and New Employment Expansion and Development (NEED) programs; $1 million wage top-up by the Yukon Government, and about $20 million as an interest-free loan. The loan will be repayable prior to, or simultaneously with, other bank loans on the basis of 25 per cent of quarterly positive future cash flows to be generated by the Faro mine. The company anticipated that the stripping program and the major concessions granted by CAMC labour unions would reduce operating costs by eight per cent and increase the mine's productivity by about 20 per cent.

United Keno Hill resumed its operation on August 1, 1983 after being closed for more than a year. Many changes which should contribute to an improvement in the long term economic viability of the mine permitted the start up.

First, the company and the unions successfully negotiated a new two-year collective agreement which calls for improved productivity, reduced unpaid leave (bush leave), abandonment of the cost-of-living allowance, a 173 per cent increase in the daily charge for room and board and a wage increase limited to 6 per cent (January 1, 1984) and 5 per cent (January 1, 1985). Second, the mine will operate at reduced capacity (⅔ of previous capacity) and work force (140 employees, 59 per cent of pre-shutdown level). Third, the company which was previously selling its concentrate to Asarco's Montana smelter, will now be selling it to Cominco at Trail, B.C. The concentrate will be trucked to Fort Nelson, and from there loaded on rail to Trail, B.C. This change of concentrate destination should result in an overall reduction in transportation costs to the company. The processing of concentrate in Canada as well as the increased Canadian content in the outbound transportation should contribute to an increase in the value-added to the Canadian economy per unit of concentrate produced at the mine.

At year end, total employment by lode mines in Yukon was 316 persons. This compared to 1 030 persons during the first half of 1982. In addition many seasonal jobs were available in 1983. Eighteen persons were employed in three underground placer mines, 40 persons were employed in small lode-mine underground exploration development and production and an estimated 750 persons were employed in surface placer mining operations.

Northwest Territories

Although two mines were closed for a significant period during the year, the Northwest Territories mining industry was able to increase its gross value of production by 9.1 per cent. The industry is now generating production revenues of more than half a billion dollars per year. Unlike Yukon, where the industry was severely affected in 1982, the NWT mining industry did not really feel the shock of the recession until the first half of 1983 with the closure of the Pine Point Mine on January 2 for a period of 6½ months, and Canada Tungsten for a period of 10 months. Over 700 employees were directly affected by these temporary closures.

The remaining gold mining producers and the two zinc-rich mines, Polaris and Nanisivik, performed relatively well during the period. At year end, all mines were back into operation and total employment was 2 369 persons compared to 2 440 in 1982.

The ability of the Northwest Territories mining industry to survive the recession better than the Yukon's is highly evident from its relative contribution to total Canadian mining output. In 1983, it accounted for 26.5 per cent of the lead, 23 per cent of the zinc, 96.9 per cent of the tungsten, 12.9 per cent of the gold and 4.6 per cent of the silver produced in Canada. In spite of the recession and some temporary closures, the mining industry in the NWT was able to increase its contribution to the value of Canadian metallic mineral production to 6.5 per cent compared to 5.6 per cent in 1982.

The Pine Point mine case was a good example of the new spirit of cooperation among key players interested in the survival of a mine. Pine Point was shut down because of high operating costs arising from the increasing ore to waste stripping ratio and low metal prices. Cominco negotiated a package of concessions with some of its suppliers, employees and governments in order to reopen the mine/mill complex on a break-even basis for a minimum of at least five months. The concessions included: reduced smelter charges; a 10 per cent reduction in rail freight rates; adjustment to electricity bills; a 15 per cent reduction in wages and benefits for staff personnel; a 10 per cent reduction on all wage classifications for one year, or less if metal prices reach 34.5¢ for lead and 60.5¢ for zinc; and a freeze on cost of living allowances. Federal government assistance through the UIC Section 38 and NEED programs in the amount of $4 million and a $1.1 million wage top-up by the Government of the Northwest Territories were provided to assist the company in carrying out an advance stripping program aimed at improving its future ore to waste stripping ratio. As a result of these concessions, the mine reopened on June 15.

Canada Tungsten reopened on November 28, after a 10-month shut down following a reorganization of senior management positions, concessions by the labour unions, which limited wage increases to 6 per cent and 5 per cent over the next two years, and the need to fulfill anticipated industrial demand. The mine reopened at half capacity and with only 130 employees representing 61 per cent of its previous work force. Of interest is the fact that the mine reopened on the basis of a tungsten price which was below the price level at the time of the shutdown. This can be interpreted as a sign of improved operating conditions at the mine following the various measures implemented since the shutdown. A further sign of company management's confidence in the long-term viability of the mine is the fact that during the shutdown period it kept about 80 employees and maintained its level of underground development and exploration at the mine site.

Giant Yellowknife Mines, which suffered a loss last year, decided to introduce some cost control programs and efficiency measures to increase the profitability of the operation. Furthermore, in an effort to increase the long term viability of the mine, the company decided to cut back production by 25 per cent to enable orderly extraction of ore reserves and to allow more time for exploration and development of additional reserves. The cut back of production affected about 65 company and contractor employees. These layoffs were, however, compensated for by the opening of the company's Salmita project in August which provided employment to about 70 persons.

Overall, compared to the Yukon, the NWT mining industry is in relatively good health and has been expanding. Furthermore, with the measures that have been taken by some of the companies, in co-operation with the labour unions, to increase efficiency and productivity, the industry should come out of the recession stronger and be well positioned to take full advantage of the economic recovery.

Review of Policy Issues

During 1983 there were several policy developments or issues of direct and indirect interest to the northern mining industry. These are discussed briefly in the following sections.

Northern Mineral Policy

Development of the northern mineral policy continued in 1983. Efforts have been concentrated on the assessment of the role of mining in the northern and national economies as well as the competitiveness and outlook for the northern mining industry. Formulation of the policy will require the consideration of the many complex interrelationships which affect northern mineral development including the provision of infrastructure, the legislative and fiscal regime, the environmental protection/mining interface, the human factors in mining, native land claims and research and development requirements.

As a continuation of the consultative process which has been part of the policy development process, a series of eight mineral policy issue papers have been developed and will be released in the Spring of 1984. Each paper provides a data base and summary of one key policy issue.

Northern Canada Power Commission - National Energy Board Hearing

In recent years, the mining industry complained that its power costs have been dramatically increased and has expressed disagreement with the rate structure developed by the Northern Canada Power Commission (NCPC). Following the release of the Penner Report, the Minister of Indian Affairs and Northern Development (IAND), with the concurrence of the Minister of Energy, Mines and Resources, requested the National Energy Board (NEB) to undertake an inquiry and advise the Minister of IAND on NCPC rate-setting methods. The purpose of the NEB inquiry was to seek an equitable solution to the dilemma of NCPC's public accountability on the one hand and the Federal Government's financial responsibility on the other hand.

Following public hearings in a number of Yukon and Northwest Territories communities, the NEB submitted its report to the Minister of IAND in August, 1983. In February 1984, Cabinet approved a new role and mandate for NCPC in northern energy as follows:

- Relocation of NCPC headquarters from Edmonton to Yellowknife
- Regulation of NCPC by a panel of the NEB with territorial participation
- Implementation of new rate setting principles to reflect the true cost of delivering power to all users
- Reassessment of NCPC's debt structure to determine whether and how much debt should be written off or converted to equity
- Continuation of direct federal energy subsidies to March 1985

Overall, these changes should be welcomed by the northern mining industry.

Northern Road Policy, A Five-Year Program

A revised Northern Roads Policy was approved on July 7, 1983. The new policy places control of policy, planning and construction for new roads and inter-territorial roads with the federal government and the responsibility for maintenance with the territorial governments. It further clarifies the Government's role in all stages of the road program as far as resource roads are concerned.

Cabinet authorized a five year road program with funding of $19.2 million per year for new road construction. Part of this program allows for federal cost sharing of initial access roads for exploration and development purposes as well as permanent access roads for the production stage of mining.

Canadian Transport Commission Inquiry - Yukon Transportation Requirements

The Canadian Transport Commission (CTC), at the request of the Yukon Government, has been conducting an inquiry into Yukon transportation systems, including the railway. The purpose of this inquiry was to determine which options would provide the most adequate, efficient and lowest cost surface transportation system, or systems, to service the short, medium and long-term requirements of Yukon. However, in view of the immediate need to address the Cyprus Anvil Mining Corporation's (CAMC) transportation requirements, the inquiry focused its attention on what would be the most cost-effective and efficient transportation system and route to service CAMC, once the mill starts to produce.

The CTC published an interim report on December 15, 1983 with its preliminary findings and recommendations. The report concluded that the lowest-cost option for the transportation of CAMC concentrates and back-haul traffic is the existing White Pass and Yukon truck-rail system when all costs are taken into consideration. All interested parties were requested to rebut or comment on the report by February 15, 1984, following which the CTC will prepare its final report and recommendations.

Yukon Placer Mining Guidelines

The Department of Indian Affairs and Northern Development, together with the Department of Environment and the Department of Fisheries and Oceans, has prepared draft environmental guidelines for the placer mining industry in Yukon which were made public in March 1983. The guidelines are designed to enhance protection of fish and wildlife resources while allowing mining of placer gold with protection of the various interests, such as the native and domestic food fisheries, commercial fisheries and mining development.

In order to review the draft Yukon Placer Mining Guidelines dealing with environmental controls in the Yukon placer mining industry, a four person review committee, appointed by the Minister of Indian Affairs and Northern Development, held an intensive round of public hearings from September to November, 1983 in five Yukon communities. The Review Committee submitted its report to the Minister of IAND in January, 1984 and it is now available to the public. The report represents the Committee's view of how best to implement guidelines governing water use and land rehabilitation for Yukon's placer mining industry. DIAND is reviewing the report, and a ministerial decision is expected in 1984.

Taxation of Northern Benefits

During 1983, the mining industry conducted an extensive publicity campaign against the proposed phase-in of taxation of northern benefits beginning in 1984. Mining companies and labour unions pointed out that life in the North was costly, and argued that government should assist people who lived there. A committee representing industry and labour was established to study the impact of the proposed new tax regime on northerners.

On December 9, 1983, following consultations between the Department of Finance and the Committee, the Minister of Indian Affairs and Northern Development announced on behalf of the Minister of Finance, that the special tax remission for housing and travel benefits received by employees in Northern Canada and isolated posts will be maintained for an indefinite period.

This decision was taken to help northern communities overcome current economic difficulties. The northern economy and, in particular, the mining industry was in a weak state due to the slow recovery of world markets and mineral prices. This tax relief should provide impetus to recovery and allow additional time for adjustment.

Pipeline Right-of-Way Narrowed

In October, 1977 a corridor 8 km (5 miles) in width, along the route of the proposed Alaska Highway Gas Pipeline, was withdrawn from surface use and mining in the Yukon. On December 28, 1983 the Minister of Indian Affairs and Northern Development announced that the land withdrawal has been revoked. This was made possible by the granting of a 240 m wide easement to Foothills Pipeline Ltd. for future construction of the pipeline.

The revocation will become effective June 29, 1984. At that time land previously within the corridor will be available for mining activity as well as surface dispositions pursuant to the *Territorial Lands Act*.

Appendix 1

Competitive Position and Survival of Northern Mines

The severe economic recession that struck the world economy in 1981-82 was particularly serious for the Canadian mining industry due to its reliance on export markets for its metal and concentrates. The recession did, however, have some positive results since it forced companies to reassess their short- and long-term competitive position. In view of the static, real price levels, the remoteness of the territories, and all the factors which contribute to increase the cost of mining north of 60°, one could ask whether or not northern mines will be able to continue to compete in world markets. The following discussion attempts to answer this question by assessing some key factors such as production costs, transportation costs and related problems, prices trends, mine maturity and profit margin.

Production Costs

The most common measure used to assess the relative competitive position of world metal producers is to rank them in terms of unit cost of metal produced. This indicator shows the ability of mines to survive negative price cycles. Using this measure, international surveys in 1981 indicated Canada was one of the lowest cost producers of zinc in the world. Two out of the three zinc producers north of 60° were in the mid range of Canadian producers, based on 1981 costs: Pine Point and Nanisivik. On the other hand, a review of 1983 company annual reports of northern precious metal mines suggest that, while profitable, they tend to have higher production costs than the major southern producers.

The ability of northern mines to compete with southern mines and other more favourably located mines in the rest of the world is mainly attributable to special factors which offset higher unit costs of productive resources employed. These factors are: richness and size of orebodies, proximity to tidewater, lower mining requirements for development and waste removal, and amenability of ore to concentration. These positive factors compensate for the higher labour unit costs (about 25 per cent), higher power rates (2 to 3 times higher) and the transportation cost and logistical problems faced by northern mines.

Transportation

Transportation is a particularly serious problem for concentrate producers as it affects both their ability to market their product and the cost. For example, the outbound freight cost of Pine Point and Cyprus Anvil represents respectively ⅓ and ¼ of their total operating cost. It also affects the cost of their inbound supplies and the size of inventories of products, spare parts and supplies. In the case of Arctic mines, the short summer shipping season for transporting bulk commodities is the main factor. For interior mines, it is the resupply time of critical components and reagents. These factors create a requirement for higher levels of working capital resulting in higher financial costs.

Figure 3
Physical Output per Person Hour Worked
Percent Deviation of Annual Average to Period Average

Figure 3-A: Selected Base Metal Mines

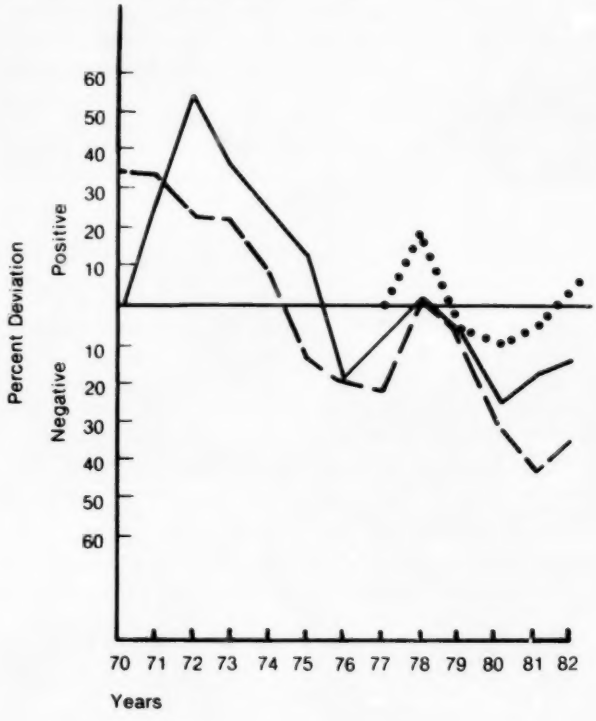
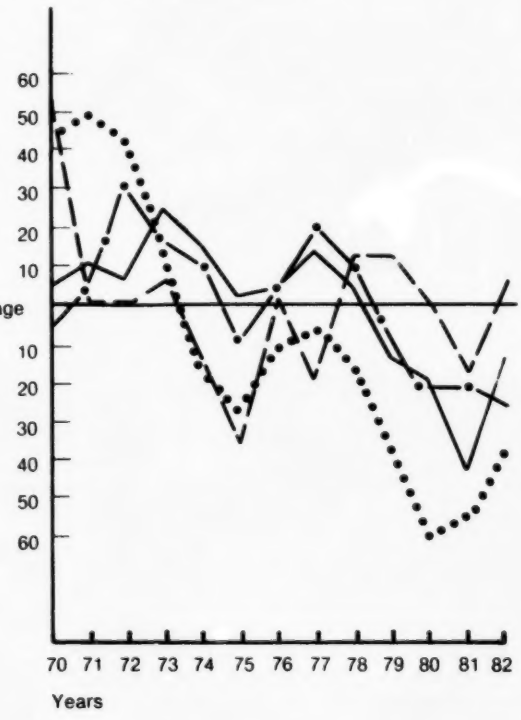


Figure 3-B: Selected Non Base Metal Mines



Metal Prices

A review of metal prices since 1960, including metals produced north of 60° (lead, zinc, tungsten, gold and silver), indicates that they were higher during the 1970s than in the 1960s. The relatively buoyant prices that northern producers enjoyed during the seventies, compared to those faced by southern copper and nickel producers is partly attributable to the fact that they did not have to face foreign competitors producing for foreign exchange to the same extent as southern copper and nickel producers. The favourable prices, combined with efficient production, led to spectacular income returns for most northern mines during that period. Most price forecasters indicate gloom for lead, copper, nickel and molybdenum, but a brighter outlook for zinc. As a result, three of the four northern lead-zinc producers seem well positioned for the future with relatively zinc-rich ore. Also optimism about precious metal prices augurs well for the future of northern gold producers.

Maturity

Many of the mines are at a mature stage of their life cycle as shown in Figure 3-A and Figure 3-B. The graphs show the deviation to average output per person hour worked for the period from 1970 to 1982, and reflect the trend in productivity as a result of labour performance, feed grades and technology. A large part of the downward trend is attributable to a combination of a lower ore grade being mined and higher stripping requirements. The downward trend shown in the graphs does not necessarily mean that the competitive position of the mines is eroding but it is a clear signal of potential problems.

Profit Margin

A key trend to consider in assessing the ability of a mine to survive is the directional relationship of unit costs of production and metal prices which indicates the trend in its profit margin. This trend can be observed by comparing Figures 4 and 5.

Figure 4 shows the percentage deviation from individual mine production costs. Figure 5 shows metal price averages for the period of 1970-1982, in constant 1982 dollars. In preparing Figure 4, annual unit production costs were determined from costs and units of production shown in annual reports. These were then adjusted to 1982 dollars using the consumer price index and an average determined for the period. The annual average (in 1982 dollars) was then compared to the period average to calculate the percentage deviation and to determine the trend of unit production costs around the average over time.

In preparing Figure 5, average annual London Metal Exchange spot prices for lead and zinc and Metals Week prices for silver and gold were converted to Canadian dollars or cents at average annual exchange rates. These prices were then escalated, averaged, and percent deviations calculated as for Figure 4.

Figure 4
Minesite Production and Administration Costs per Unit of Output
Percent Deviation of Annual Average to Period Average (in 1982 dollars)

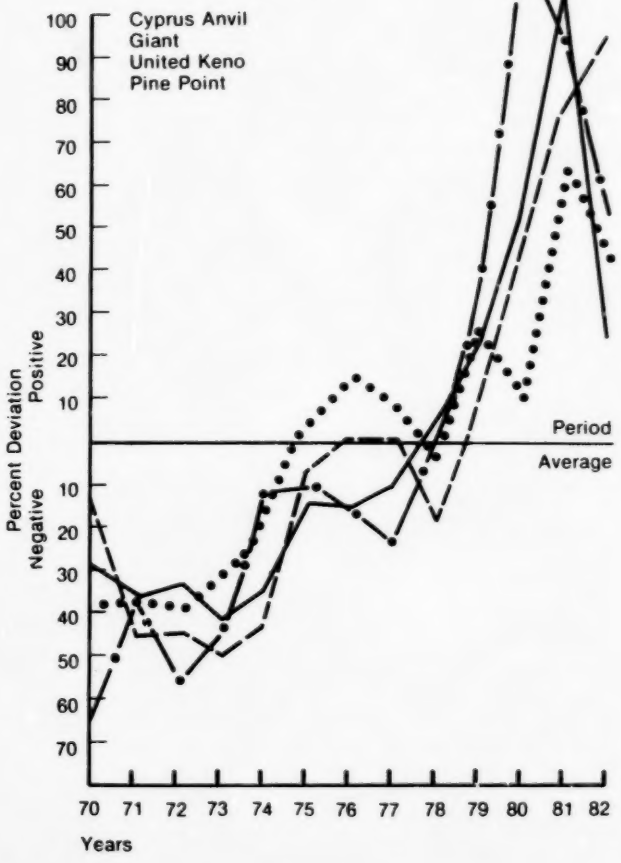
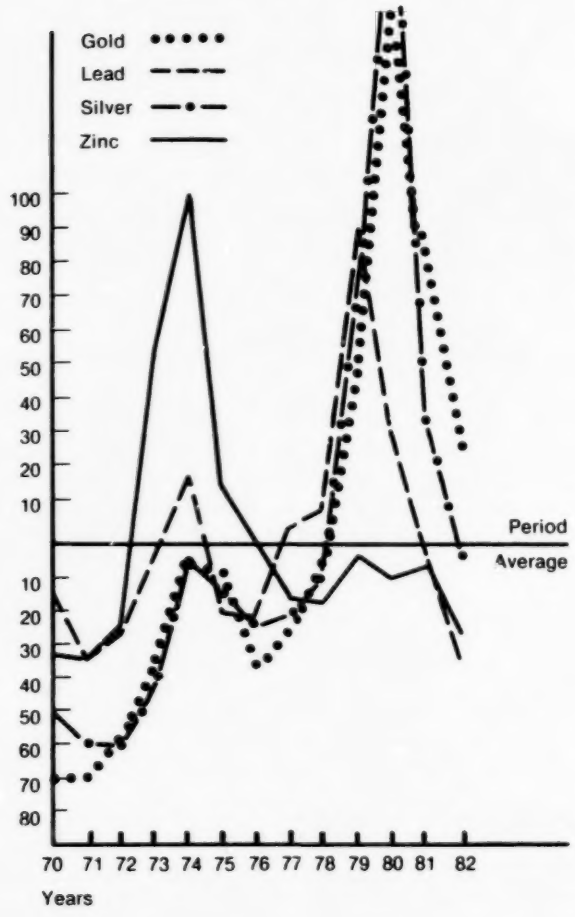


Figure 5
Metal Prices
Percent Deviation of Annual Average to Period Average (in 1982 Dollars)



Comparing the trend in production costs (Figure 4) with that of metal prices (Figure 5), it is clear that while efforts at unit cost reduction have followed price declines, the upward cost trend is much steeper than price trends for the base metals. The increasing differential between the prices and production cost trends over the years is an indication of reduced profit margin and ability of mines to survive during major downward price cycles. Based on current information, it is not possible to determine the relative impact of intentional feed grade reductions at higher prices, wage demands, and overall declines in reserve grades and mining options on the declining output per employee and increasing unit cost of production during that period.

Conclusion

There seems little doubt that individual northern mines have been profitable and will be profitable in the future. However, some concerns were identified. Many northern mines are arriving at a mature stage in their life cycle. Their metal output per person year has been declining and their production costs have increased. Unless these trends are offset by improved metal prices or by increased productivity, some current northern producers may face problems in years ahead.

As Canadian mines have little control of international prices, the key to future competitiveness seems to lie in finding and developing new richer orebodies, and using ingenuity to reduce the unit production costs of existing mines. While solutions to these problems lie with industry, the federal government has a role in establishing a framework within which the industry can plan and act with confidence.

Figure 6
Yukon Territory
Mineral Production
(Millions of Dollars)

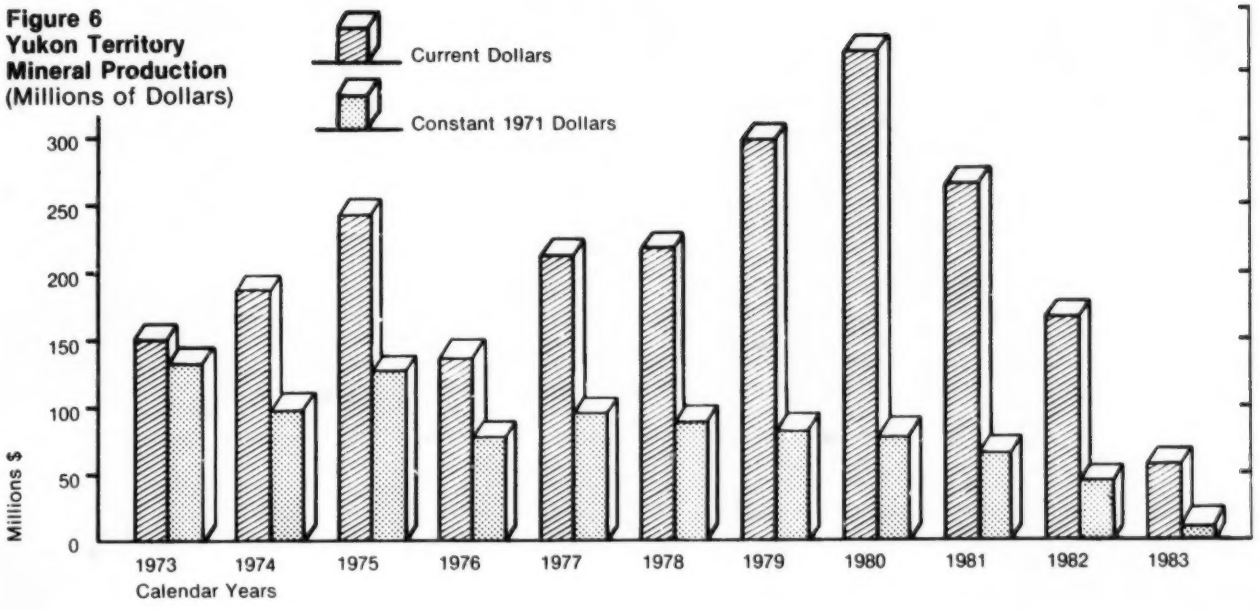
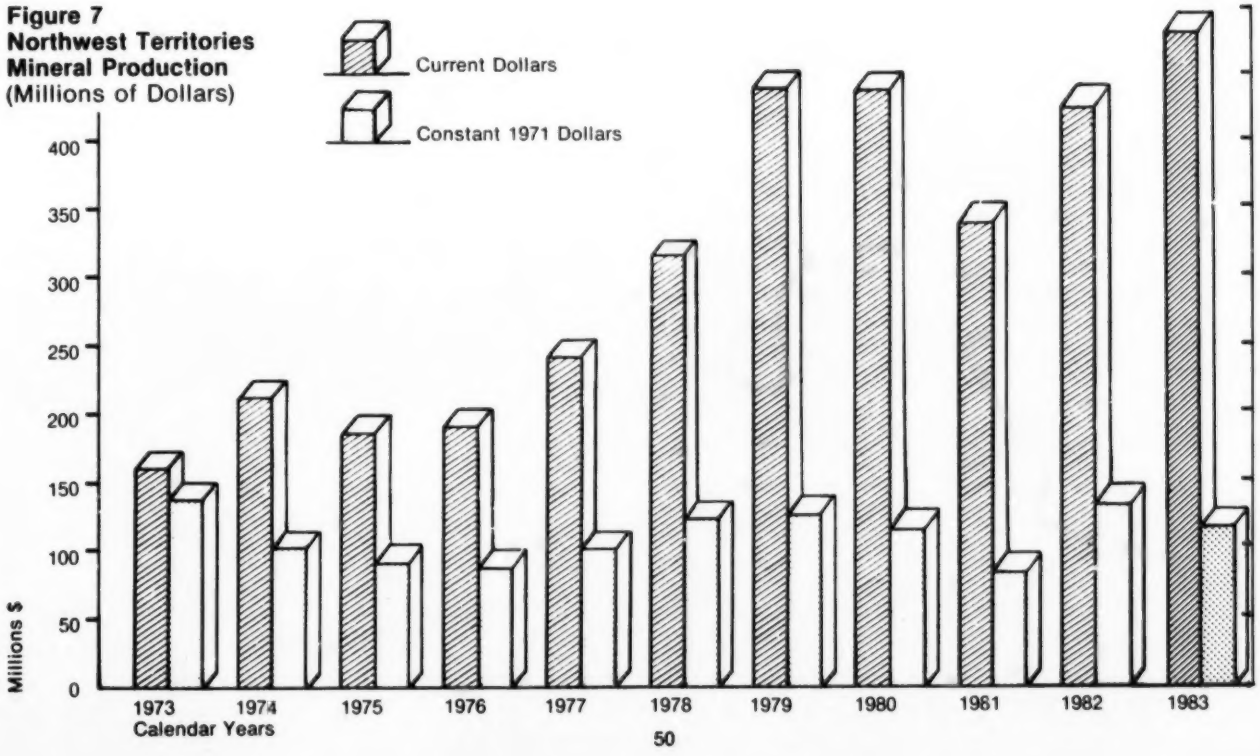


Figure 7
Northwest Territories
Mineral Production
(Millions of Dollars)



Appendix 2

Organizational Structure and Mandate

As of October 1984, the Minister and departmental officers responsible for the administration of mines and mineral resources in the Northwest Territories and the Yukon were:

Minister:	David E. Crombie
Deputy Minister:	M.A.J. Lafontaine
Assistant Deputy Minister (Northern Affairs):	G.N. Faulkner
Director General, Northern Resources and Economic Planning:	R.D. Glass
Acting Director, Mining Management and Infrastructure:	Dr. J. Lazarovich
Assistant Director, Mining Administration:	J.M. Hodgkinson
Head, Mining Resources Section:	Dr. D.D. Brown
Evaluation Geologist:	T.W. Caine
Technical Information Officer:	P.T. Marion
Head, Mining Lands Section:	T.W. Dent
Head, Legislation:	P.M. Corrigan
Head, Royalties:	M.A. Fish
Administration Clerk:	N. Horton
Acting Assistant Director, Mineral Policy:	J. Fraser
Acting Assistant Director, Infrastructure:	W.G. Cleghorn

Address:

Department of Indian Affairs
and Northern Development
Les Terrasses de la Chaudière
OTTAWA, Ontario
K1A 0H4

Phone (Mining) (819) 997-0911

Northern Affairs Program

Yukon Region

Director General	M.J. Morison
Director, Mineral Resources:	C. Ogilvie
Chief Geologist:	Dr. J.A. Morin
District Geologist:	J.G. Abbott
Placer Geologist:	S. Morrison
Staff Geologists:	K.J. Grapes
	D. Emond
Regional Manager, Mineral Rights:	B.R. Baxter
Mining Recorders:	D.F. Jennings, Whitehorse
	B. Proudfoot, Dawson
	R.G. Ronaghan, Mayo
	P. McLeod, Watson Lake
Regional Mining Engineer:	C.H. Macdonald
District Mining Engineer:	N. Prasad
Mine Rescue Superintendent:	N. Mainer
Environmental Technician:	D. Cormier
Chief Claim Inspector:	G. Gilbert
Mining Claim Inspectors:	L. Olynyk
	R. Whittingham

Address:

Department of Indian Affairs
and Northern Development
200 Range Road
WHITEHORSE, Yukon
Y1A 3V1

Phone (switchboard) (403) 668-5151

Northern Affairs Program

Northwest Territories Region

Director General:	P.H. Beaubier
Director, Minerals and Economic Analysis:	G. Patenaude
Chief Geologist:	Dr. W.A. Padgham
District Geologists:	Dr. W.A. Gibbins
	P.J. Laporte
	C.C. Lord
	J.M. Seaton
Staff Geologist:	J.A. Brophy
Archive Geologist:	C. Ellis
Project Geologist:	Vacant
Regional Manager, Mining Lands:	E.D. Cook
Mining Recorders:	H.B. Mercer
	T. Miedema

Address:

Department of Indian Affairs
and Northern Development
P.O. Box 1500
YELLOWKNIFE, Northwest Territories
X1A 2R3

Phone (switchboard) (403) 920-8110

Department of Indian Affairs and Northern Development

The Department of Indian Affairs and Northern Development (DIAND) is responsible for the administration of all mines and mineral activities in the Yukon and Northwest Territories. DIAND, as part of the federal government, administers the policy and legislative instruments which govern the mining industry in both territories.

Within DIAND's Northern Affairs Program, major functional groups, which deal directly with the mining industry, are the Northern Resources and Economic Planning Branch and the Northern Environment Branch at Headquarters, and the Regional Northern Affairs Program Branches in the Yukon Region and Northwest Territories Region.

The Northern Resources and Economic Planning Branch at Headquarters consist of three directorates: Northern Economic Planning, Oil and Gas Management and Major Projects, and Mining Management and Infrastructure. This branch is accountable for the development of departmental strategies, policies, legislation, plans and programs related to northern economic development, including the development and management of non-renewable resources and northern economic infrastructure. In addition, the Branch has a headquarter's function in the co-ordination of federal and territorial activities in the area of northern economic resource development and departmental policies and mechanisms to provide socio-economic development and benefits.

In 1982, the Northern Resources and Economic Planning Branch underwent a re-organization which resulted in the establishment of the Mining Management and Infrastructure Directorate, integrating the Transportation and Communications Division, Northern Roads and Airstrips Division, Non-Renewable Resources Development Division and the Mining Division. The Mining Management and Infrastructure Directorate brings the mining and infrastructure elements of the Northern Program together to give co-ordination on issues related to mineral policy, mineral resources, mining industry development, mining legislation and infrastructure support.

The Mining Management and Infrastructure Directorate develops and administers federal northern mineral policy and legislation, assesses infrastructure requirements of existing and potential resource operations requiring roads, airstrips and other transportation modes, and administers mining and mineral rights. The Directorate consists of the Mining Administration Division, the Mineral Policy Division and the Infrastructure Division.

Mining Administration Division

The Mining Administration Division develops policy related to the regulation of the Northern mineral industry, which includes providing for the consultative process with industry and initiating and drafting of appropriate acts, regulations and policy documents related to the disposition and to the administration of mineral rights in the Yukon Territory and Northwest Territories. The Division administers the royalty provisions of the *Yukon Quartz Mining Act, Canada Mining Regulations* and *Territorial Coal Regulations*. The Division advises and negotiates with various government agencies whose responsibilities interface with mining in the Territories, provides information on current and proposed exploration and mining developments and maintains a microfiche library of assessment reports, geological reports and other mineral resource information.

Mineral Policy Division

The Mineral Policy Division develops policies and plans to promote the orderly management and development of mineral resources in the Yukon and Northwest Territories. In support of these activities, it conducts studies and investigations of the economic aspects of mineral industry operations. Similar studies and investigations are also carried out to assess proposed major new mine developments in the Territories and to monitor existing operations. A major activity of the Division, together with Mining Administration Division and Infrastructure Division, at present, is the development of a northern mineral policy to guide mineral development in the Territories over the next decade. Although only the preliminary phases of policy development have been completed, the Minister has stated that he would like to address such issues as the role of mining in the northern economy, the involvement of native people, the provision of infrastructure, the creation of a favourable investment climate through the maintenance of an appropriate fiscal and regulatory regime and the establishment of an appropriate balance between people, minerals and the environment.

Infrastructure Division

The Infrastructure Division is responsible for policy, assessing, planning, programming and funding of infrastructure requirements in the North including roads, airstrips and other transportation modes within the general framework of northern development strategies, policies, plans and programs for northern economic development. The Division provides overall management for the Northern Roads Program. In addition, it manages the Northern Resource Roads Program under which the Department enters cost sharing agreements with industry for the construction of initial and permanent access roads.

Regional Offices – Yukon and Northwest Territories

The Yukon Region Branch and Northwest Territories Region Branch of the Northern Affairs Program are major functional groups, which under the direction of regional Directors General, administer the mandate of the Program and the provisions of mining legislation and regulations within the respective Territories. Offices are located at Whitehorse, Y.T. and Yellowknife, N.W.T.

The Regional Branches have the following subunits: Mining Lands Section, Geological Services Sections and a Mining Inspection Section (in the Yukon only).

Mining Lands Sections

The Mining Lands Section in the Yukon and Northwest Territories administrative offices have been divided into seven mining districts. A mining recording staff is responsible for the disposition of mineral rights within each district in accordance with applicable legislation. There is a Supervising Mining Recorder in each territory, whose principal function is to ensure that the regulatory requirements are followed in the administration of the various mining acts and regulations.

Geolcgical Services Sections

Geological Services Sections publish geological reports and maps and provide geological services to the mineral industry in both Territories. Offices are maintained at Whitehorse and Yellowknife. Two core libraries, the H.S. Bostock Library in Whitehorse and the C.S. Lord Library in Yellowknife preserve diamond drill core.

Each core library has laboratory facilities for core splitting, diamond-saw cutting, thin section preparation and core storage. Regional and district geologists conduct mineral property examinations, collect rock and mineral specimens and advise the mineral industry, government departments and research scientists on geological and exploration matters. Department geologists assist prospectors in identifying rock and mineral specimens, by conducting prospector training courses and preparing geological compilation maps on mineralized areas.

Mining Inspection Section

In the Yukon, the Mining Inspection Section gives advice on the *Mining Safety Ordinance* and *Mine Safety Regulations* of the Yukon Territory as well as the *Blasting Ordinance and Regulations of the Yukon Territory*.

It also prepares new safety legislation when required. A regional mining engineer is stationed at Whitehorse. This senior mining engineer has a staff consisting of a district engineer, an electrical-mechanical engineer, an environmental engineer, a mine rescue superintendent, three claim inspectors and a clerk.

The Section is responsible for the following: inspection of mines, quarries and blasting operations to ensure compliance with safety legislation; inspection of mineral claims to ensure compliance with the *Yukon Quartz Mining Act* and the *Yukon Placer Mining Act*; ensuring that sufficient mine personnel are trained in mine rescue, recovery operations and first aid; conducting ventilation and dust surveys; monitoring radioactive contamination, and carrying out environmental studies at underground and surface mining properties.

Table 9, Mineral Production - 1974-1983
Tableau 9, Production des minéraux - 1974-1983

Yukon Territory - Yukon

Mineral *Minéraux*	1974	1975	1976	1977	1978	1979	1980	1981	1982(R)	1983(P)
Gold - Or	$ 4 111 631	5 255 077	4 401 075	4 656 118	8 518 731	13 749 271	63 029 000	66 382 000	39 721 000	50 541 000
g - gr	823 371	997 986	1 111 949	921 907	1 202 149	1 190 268	2 982 000	3 746 000	2 656 000	3 008 000
Silver - Argent	$ 26 800 905	28 531 397	12 809 321	20 154 760	28 462 559	54 218 064	114 120 000	32 339 000	29 943 000	8 155 000
g - gr	180 082 381	196 943 109	92 697 630	127 415 268	143 459 000	129 982 000	147 000 000	80 000 000	95 000 000	18 000 000
Lead - Plomb	$ 41 194 600	54 888 680	15 999 040	47 627 667	64 322 403	103 374 279	71 558 000	54 935 000	25 733 000	231 000
kg - kg	90 242 227	122 863 633	32 035 681	68 621 899	79 233 298	78 250 062	65 771 000	55 970 000	35 493 000	391 000
Copper - Cuivre	$ 15 571 426	11 928 559	16 045 963	8 953 814	16 474 354	18 442 058	27 082 000	20 123 000	14 654 000	
kg - kg	9 111 183	8 487 245	10 642 540	5 843 210	10 018 826	7 778 231	10 433 000	9 094 000	7 510 000	
Zinc - Zinc	$ 60 899 995	95 400 540	39 233 926	80 562 287	74 076 827	109 460 866	88 313 000	94 237 000	58 519 000	
kg - kg	79 151 212	115 394 553	47 300 153	102 846 637	96 673 141	113 572 783	90 938 000	78 806 000	54 537 000	
Cadmium - Cadmium	$ 17 331	15 423	13 220	11 595	355					
kg - kg	1 977	2 050	2 284	1 670	58					
Asbestos - Amiante	$ 22 752 400	32 820 720	35 310 723	47 493 872	26 948 800					
tonnes - tonnes	82 459	103 735	103 431	95 590	53 255					
Sand and Gravel -	$								550 000	525 000
Sable et gravier	t								463 000	420 000
Coal - Charbon										
tonnes - tonnes	15 447	23 326	9 046	18 779	16 578	23 003	16 529	20 860		
Total	$171 348 288	228 840 396	123 813 268	209 460 113	218 804 029	299 244 538	364 102 000	268 016 000	169 120 000	59 362 000

Source: Mineral Policy Sector, Energy, Mines and Resources and Northern Resources and Economic Planning, Indian Affairs and Northern Development.
(P) Preliminary Figures, (R) Revised Figures

Secteur de la politique minérale, Énergie, Mines et Ressources et Planification des ressources et de l'économie du Nord, Affaires indiennes et du Nord Canada
(P) chiffres provisoires (R) chiffres révisés.

Table 10, Mineral Production - 1974-1983
Tableau 10, Production des minéraux - 1974-1983

Northwest Territories - Territoires du Nord-Ouest

Mineral *Minéraux*	1974	1975	1976	1977	1978	1979	1980	1981	1982(R)	1983(P)
Gold - Or	$ 28 651 414	28 754 047	24 390 081	31 336 428	45 769 718	61 868 488	96 920 000	85 495 000	91 415 000	153 067 000
g - gr	5 737 565	5 460 651	6 162 252	6 204 583	6 458 948	5 355 926	4 209 000	4 825 000	6 113 000	9 128 000
Silver - Argent	$ 17 669 851	8 883 385	14 343 774	18 716 334	23 854 173	34 770 651	41 331 000	13 465 000	16 073 000	22 993 000
g - gr	118 728 409	61 319 168	103 794 822	118 325 557	120 237 000	83 358 000	53 000 000	33 000 000	51 000 000	51 000 000
Copper - Cuivre	$ 840 719	526 889	639 980	445 850	518 993	941 732	679 000	613 000	419 000	
kg - kg	491 923	374 885	424 469	291 959	315 624	397 191	262 000	277 000	215 000	
Lead - Plomb	$ 34 932 761	37 254 292	26 440 157	40 833 313	56 898 673	80 117 935	55 853 000	44 680 000	46 367 000	40 444 000
kg - kg	76 524 844	83 390 558	52 942 453	58 832 599	70 088 814	60 645 969	51 337 000	45 522 000	63 955 000	68 491 000
Zinc - Zinc	$132 251 480	106 650 304	122 438 035	125 104 245	143 911 352	205 600 051	172 556 000	159 764 000	229 110 000	257 069 000
kg - kg	171 886 138	129 002 037	147 610 457	159 709 355	187 809 913	213 323 454	175 685 000	133 604 000	213 523 000	223 538 000
Cadmium - Cadmium	$	1 027	3 179	2 677						
kg - kg		137	549	386						
Tungsten Trioxide - Trioxyde de tungstène										
kg - kg	1 613 700	1 477 731	2 168 154	2 284 409	2 885 619	3 254 067	4 007 000	2 515 000	2 925 000	1 491 000
Tungsten and Arsenic Trioxide - Tungstène et trioxyde d'arsenic	$					53 675 858	68 119 000	93 005 000	42 215 000	17 583 000
Sand and Gravel -	$								41 482 000	39 780 000
Sable et gravier	t								6 625 000	6 000 000
Stone - Pierre	$								1 268 000	1 245 000
	t								323 000	300 000
Total	$214 346 225	182 069 944	188 255 206	216 439 447	270 952 909	436 974 715	435 458 000	397 022 000	468 349 000	532 181 000

Source: Mineral Policy Sector, Energy, Mines and Resources and Northern Resources and Economic Planning, Indian Affairs and Northern Development.
(P) Preliminary Figures, (R) Revised Figures

Secteur de la politique minérale, Énergie, Mines et Ressources et Planification des ressources et de l'économie du Nord, Affaires indiennes et du Nord Canada
(P) chiffres provisoires (R) chiffres révisés